


STATE OF NEW HAMPSHIRE

INTER-DEPARTMENT COMMUNICATION

FROM:  Matt Urban
Chief, Operations Management Section

DATE: January 9, 2019

AT (OFFICE): Department of Transportation

SUBJECT: Dredge & Fill Application
Warner, 40512

Bureau of Environment

TO: Gino Infascelli, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject major impact project. This project is classified as major per Env-Wt 303.02(p). The project is located on Interstate-89 in the Town of Warner, NH. The proposed work consists of rehabilitating the roadway pavement and appurtenances along Interstate 89 from MM 16.6 to MM 20.5. The work will include reclaiming the mainline roadway pavement, inlaying ramps at exits 8 and 9, inlaying bridges, replacing guardrail, repairing and replacing drainage features, clearing trees, scaling rock outcroppings, and repairing slopes.

This project was reviewed at the Natural Resource Agency Coordination Meeting on September 19, 2019. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link:
<http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm>

Mitigation for these projects was discussed at the Natural Resource Agency Coordination Meeting. The proposed mitigation consists of a single and onetime in-lieu fee payment in the amount of \$186,503.04

Two payment vouchers were processed for this project because additional impacts were accounted for after the first payment voucher had been made. The first payment was in the amount of **\$8,334.40 (PV#553281)** the second payment was in the amount of **\$286.20 (PV#554136)**. The two payments combined equal \$8,620.60 as referenced in the application fee calculation.

The lead people to contact for this project are Tobey Reynolds, Bureau of Highway Design (271-2731 or tobey.reynolds@dot.nh.gov) or Matt Urban, Chief Operations Management Section, Bureau of Environment (271-3226 or matt.urban@dot.nh.gov)

If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Wetlands Program Manager, Bureau of Environment.

MRU:mru

cc:

BOE Original

Town of Warner (4 copies via certified mail)

Warner River Local Advisory Committee (via certified mail)

David Trubey, NH Division of Historic Resources (Cultural Review Within)

Bureau of Construction

Carol Henderson, NH Fish & Game (via electronic notification)

Maria Tur, US Fish & Wildlife (via electronic notification)

Mark Kern, US Environmental Protection Agency (via electronic notification)

Michael Hicks, US Army Corp of Engineers (via electronic notification)

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WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau Land Resources Management

Check the status of your application: www.des.nh.gov/onestop

RSA/Rule: [RSA 482-A/ Env-Wt 100-900](#)



Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.
			Check No.
			Amount
			Initials

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to [Guidance Document A](#) for instructions.

☒ Standard Review (Minimum, Minor or Major Impact)

☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the [Determine if Mitigation is Required Frequently Asked Question](#).

Mitigation Pre-Application Meeting Date: Month: 09 Day: 19 Year: 2018

☐ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality that wetland impacts occur within.

ADDRESS: **Interstate 89, MM 16.6 to MM 20.5.**

TOWN/CITY: **Warner**

TAX MAP: **NA**

BLOCK: **NA**

LOT: **NA**

UNIT: **NA**

USGS TOPO MAP WATERBODY NAME: **Warner River**

☐ NA

STREAM WATERSHED SIZE:

☐ NA

LOCATION COORDINATES (If known): **NA**

☐ Latitude/Longitude ☐ UTM ☐ State Plane

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The proposed project will rehabilitate roadway pavement and appurtenances along Interstate 89 from MM 16.6 to MM 20.5 in the town of Warner. The work will include reclaiming the mainline roadway pavement, inlaying ramps at exits 8 and 9, inlaying bridges, replacing guardrail, repairing and replacing drainage features, clearing trees, scaling rock outcroppings, and repairing slopes.

5. SHORELINE FRONTAGE:

☒ NA This does not have shoreline frontage.

SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the [Land Resources Management Web Page](#).

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Individual Sewerage Disposal per RSA 485-A:2	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Subdivision Approval Per RSA 485-A	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Shoreland Permit Per RSA 483-B	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: **NHB 18 - 0700**

b. ☒ [Designated River](#) the project is in ¼ miles of: **Warner River**; and
date a copy of the application was sent to the [Local River Management Advisory Committee](#): Month: ____ Day: ____ Year: ____
☐ N/A

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

8. APPLICANT INFORMATION (Desired permit holder)LAST NAME, FIRST NAME, M.I.: **NH Department of Transportation**TRUST / COMPANY NAME: **NHDOT Bureau of Highway Design**MAILING ADDRESS: **PO Box 483**TOWN/CITY: **Concord**STATE: **NH**ZIP CODE: **03302**EMAIL or FAX: **Tobey.Reynolds@dot.nh.gov**PHONE: **603-271-7421**ELECTRONIC COMMUNICATION: By initialing here: TR, I hereby authorize NHDES to communicate all matters relative to this application electronically.**9. PROPERTY OWNER INFORMATION (If different than applicant)**

LAST NAME, FIRST NAME, M.I.:

TRUST / COMPANY NAME:

MAILING ADDRESS:

TOWN/CITY:

STATE:

ZIP CODE:

EMAIL or FAX:

PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

10. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.:

COMPANY NAME:

MAILING ADDRESS:

TOWN/CITY:

STATE:

ZIP CODE:

EMAIL or FAX:

PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

11. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail.



Tobey Reynolds
Property Owner Signature

Tobey Reynolds
Print name legibly

1/8/19
Date

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

MUNICIPAL SIGNATURES

12. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

	Print name legibly	Date
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DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

	Print name legibly	Town/City	Date
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DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3, I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

14. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland	204	<input type="checkbox"/> ATF	405	<input type="checkbox"/> ATF
Scrub-shrub wetland	2034	<input type="checkbox"/> ATF	1257	<input type="checkbox"/> ATF
Emergent wetland	1956	<input type="checkbox"/> ATF	11108	<input type="checkbox"/> ATF
Wet meadow		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Intermittent stream	1053 / 153	<input type="checkbox"/> ATF	320 / 48	<input type="checkbox"/> ATF
Perennial Stream / River	7019 / 408	<input type="checkbox"/> ATF	1611 / 134	<input type="checkbox"/> ATF
Lake / Pond	/	<input type="checkbox"/> ATF	/	<input type="checkbox"/> ATF
Bank - Intermittent stream	134 / 120	<input type="checkbox"/> ATF	209 / 34	<input type="checkbox"/> ATF
Bank - Perennial stream / River	9150 / 624	<input type="checkbox"/> ATF	6643 / 458	<input type="checkbox"/> ATF
Bank - Lake / Pond	/	<input type="checkbox"/> ATF	/	<input type="checkbox"/> ATF
Tidal water	/	<input type="checkbox"/> ATF	/	<input type="checkbox"/> ATF
Salt marsh		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Sand dune		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Prime wetland		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Prime wetland buffer		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Previously-developed upland in TBZ		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Docking - Lake / Pond		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Docking - River		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Docking - Tidal Water		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
Vernal Pool		<input type="checkbox"/> ATF		<input type="checkbox"/> ATF
TOTAL	21550 / 1305		21553 / 674	

15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of \$ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 43103 sq. ft. X \$0.20 = \$ 8,620.60

Temporary (seasonal) docking structure: 0 sq. ft. X \$1.00 = \$ 0

Permanent docking structure: 0 sq. ft. X \$2.00 = \$ 0

Projects proposing shoreline structures (including docks) add \$200 = \$ 0

Total = \$ 8,620.60

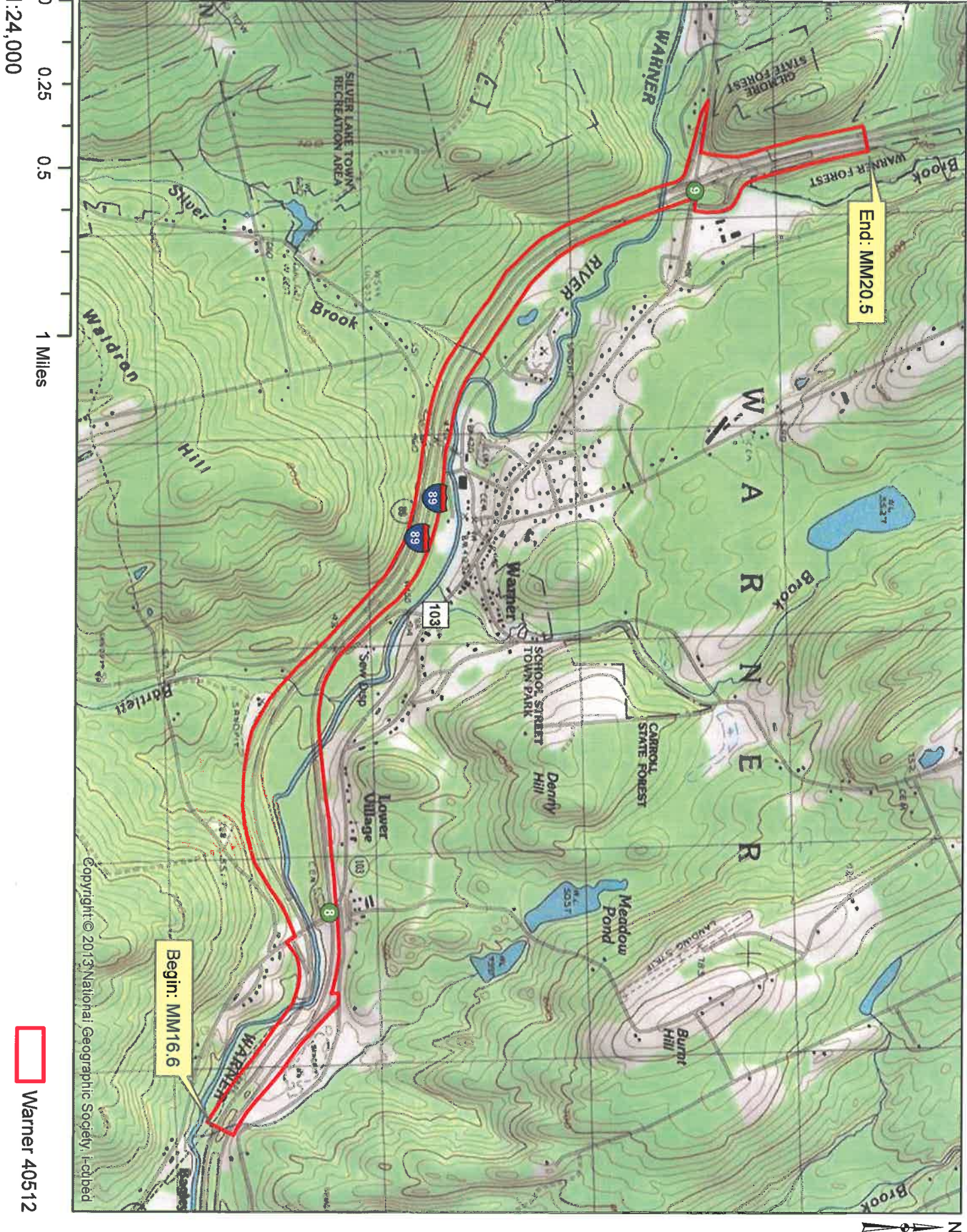
The Application Fee is the above calculated Total or \$200, whichever is greater = \$ 8,620.60

lm@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

Warner 40512: Interstate 89 Rehabilitation





WETLANDS PERMIT APPLICATION – ATTACHMENT A MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop



RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The proposed project is needed to maintain the functionality and extend the lifespan of Interstate 89 in Warner. Additionally, the project will rehabilitate and upgrade the roadway appurtenances that are in need of repair, functionally obsolete, or fail to meet current safety standards. Work will include reclaiming and resurfacing the existing mainline roadway pavement, inlaying the ramps at exits 8 and 9, inlaying bridges and repairing expansion joints, replacing existing guardrail, repairing and replacing drainage features, clearing trees in the median and shoulders, scaling rock outcroppings, and repairing failing slopes.

The drainage work will consist of repairing and replacing existing closed drainage system structures, including drop inlets, catch basins, slope drains underdrains and headwalls. Individual culverts will be slip-lined perched outlets will be repaired with backwatering structures. Work will also include repairs to existing open drainage system structures including the channel stabilization and repair of existing manmade stormwater conveyance ditches. The proposed drainage work is needed to ensure that water, including natural stream and wetland systems and stormwater runoff, are effectively transported through the interstate system in a way that prevents flooding, limits erosion, and minimizes the sedimentation of local waterways.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

With the exception of the no-build alternative, which would not address the structural and safety deficiencies of Interstate 89 and its appurtenances, the proposed work is the alternative with the least impact on wetlands and surface waters. The proposed roadway work is limited to the existing footprint, and the drainage work is limited to existing drainage system structures.

3. The type and classification of the wetlands involved.

Classifications for wetlands types that will be impacted by the project are as follows:

BANK- Perennial Stream; BANK- Intermittent Stream; R2UB1,2; R2UB2; R2UB3; R4UB1; R4UB1,2; R4SB3,4; R4SB6; PEM1E; PEM1E/PFO1E; PFO1A; PFO1E; PFO1E/PSS1E; PSS1E; PSS1E/PEM1E

Classifications for additional wetland types that are located in the project area but are not proposed to be impacted are as follows:

R2UBH; R3UBH; PSS1Eh; PSS1C/PFO1C

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

There are several wetland systems which will be impacted by the proposed project due to the length and nature of the proposed work. Some of these systems are small, isolated wetlands adjacent to the roadway or within the roadway median, while others are connected by streams or via the nearby Warner River, which closely follows the roadway in this area. There is a large floodplain wetland associated with the Warner River that is located in the median of I89 between MM17.4 and MM18 that many small streams and closed drainage outlets are connected to.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The wetland types that will be impacted by this project include emergent, scrub-shrub, and forested palustrine wetlands as well as perennial and intermittent riverine wetlands and their banks. These wetland types are common in New Hampshire and the areas which will be impacted do not display unique characteristics that might distinguish them from other wetlands of the same classification. There will be no work in sand dunes or tidal buffer zones.

6. The surface area of the wetlands that will be impacted.

The proposed work will result in 21,553 square feet of temporary impact and 21,550 square feet of permanent impact to jurisdictional wetlands, including the following types of impacts:

Delineated Wetlands:

12,770 square feet of temporary impact and 4,194 square feet of permanent impact

Perennial Streams:

1,611 square feet of temporary and 7,019 square feet of permanent impacts to perennial stream channels

6,643 square feet of temporary and 9,150 square feet of permanent impacts to perennial stream banks

Intermittent Streams

320 square feet of temporary and 1,053 square feet of permanent impacts to intermittent stream channels

209 square feet of temporary and 134 square feet of permanent impacts to intermittent stream banks

7. The impact on plants, fish and wildlife including, but not limited to:

- a. Rare, special concern species;
- b. State and federally listed threatened and endangered species;
- c. Species at the extremities of their ranges;
- d. Migratory fish and wildlife;
- e. Exemplary natural communities identified by the DRED-NHB; and
- f. Vernal pools.

a. There are no rare species or species of special concern in the vicinity of the project area.

b. The NH Natural Heritage Bureau (NHNHB) has reviewed the project area and determined that although there are known records of protected species in the vicinity of the project area, the proposed work will not impact these species and no further coordination is necessary. The US Fish and Wildlife Service (USFWS) has also reviewed the project area and determined that the project is located within the range of northern long-eared bat (*Myotis Septentrionalis*) (NLEB). This project will require the clearing of potential habitat trees during the NLEB active season and is therefore being reviewed as a May Affect, Likely to Adversely Affect project in accordance with the USFWS, Federal Highway Administration, Federal Transit Administration and Federal Railway Administration Programmatic Consultation. Consultation is pending concurrence from USFWS. All necessary best management practices will be required in order to promote NLEB conservation measures and minimize impacts to this federally threatened species.

c. There are no species at the extremities of their ranges in the vicinity of the project area.

d. No migratory fish or wildlife will be impacted by the proposed work.

e. NHNHB did not identify any exemplary natural communities within project area.

f. There are no vernal pools located within the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

The proposed project will improve the condition of the highway drainage system and other roadway appurtenances on Interstate 89, therefore extending the functional lifespan of the highway and preserving the existing public commerce, navigation and recreational opportunities.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

Due to the location and nature of the work, which is limited to existing infrastructure components along the Interstate 89 corridor, there will be no noticeable changes to any aesthetic features for the general public. All disturbed areas will be stabilized with stone or returned to a vegetated state prior to the completion of construction.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

There will be no obstruction to public rights of passage. All of the proposed work will occur within the controlled access right-of-way of Interstate 89 with the exception of 2 discrete locations where temporary construction easements will be procured to repair washouts that have extended onto neighboring lands.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

The proposed work is limited to that which is necessary to ensure that the existing drainage features and crossings are structurally sound and functioning efficiently. This work should have a positive impact on the upstream and downstream abutting properties as it will help ensure that stormwater runoff from the highway is being captured and treated appropriately, and that those crossings carrying wetlands or streams under the highway are not at risk for collapse or other structural deficiencies which would impair the function of the drainage system and possibly result in erosion and sedimentation of the waterways flowing through the project.

12. The benefit of a project to the health, safety, and well being of the general public.

The proposed work will benefit the health, safety, and well-being of the general public by upgrading the existing guardrail to meet current safety standards, rehabilitating the existing drainage system, and preventing the potential collapse or malfunction of structurally deficient infrastructure which could destabilize roadway embankments or otherwise damage the highway.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The proposed work is primarily intended to maintain and rehabilitate existing infrastructure and will not alter the existing drainage pattern for stormwater runoff from Interstate 89 or the existing flow path for streams and wetlands which cross under or are adjacent to the highway. In some cases, at larger crossings carrying wetlands or streams under the road, the inlet and outlet will be dredged to clear out debris which has accumulated and stone aprons will be repaired or new stone will be applied to stabilize the area. In other instances, existing manmade ditch lines will be dredged and returned to a vegetated swale in order to ensure that the intended stormwater filtering benefits of these areas are achieved. In general, the work involving replacement of catch basins, drop inlets, slope drains, underdrains and headwalls will not alter any pattern or existing condition and will not impact water quality. The proposed work will total over one acre of earth disturbance and therefore will comply with the Environmental Protection Agency's National Pollutant Discharge Elimination System's Construction General Permit and other NHDES Alteration of Terrain Bureau's rules and regulations.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

The proposed project will not increase the likelihood of flooding, erosion or sedimentation in the project area, as the proposed work is limited to the maintenance and improvement of existing drainage structures. The work will stabilize and extend the functional lifespan of many of these structures which are no longer structurally sound and will therefore decrease the potential for failure and resulting erosion and sedimentation of nearby water resources. No new fill will be placed in floodplains which could increase the base flood elevation.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

The proposed work will not redirect current or wave energy.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

Many of the small wetland systems which will be impacted by the proposed drainage work are located entirely within the State's Limited Access Right of Way (LAROW) for Interstate 89, so there is no potential for additional impacts from abutting landowners. Some of the larger wetland systems in the project area, including the Warner River, do extend beyond the LAROW. In these cases, impacts proposed by the Department of Transportation are generally specific to those necessary for completion of roadway repair and maintenance work. It is unlikely that the abutting landowners would propose similar impacts, however, as most of the work is intended to stabilize and replace in-kind existing drainage features, additional impacts would contribute to the effort of ensuring existing functionality of the highway system by ensuring that water flows through the area efficiently and safely.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

The proposed project includes many small drainage improvements along the length of the project, which will impact many wetland areas to varying degrees. Ultimately, the proposed work is intended to maintain, stabilize or upgrade the existing infrastructure in order to extend the functional lifespan of the existing highway facility and drainage system. The proposed impacts at each location are necessary to complete these upgrades and will employ all necessary Best Management Practices as described in the NHDES Stormwater Manual Volume 3 to reduce the erosion and sedimentation of nearby wetlands during construction. Due to the limited impacts at each location and the overall maintenance and improvement of the existing system resulting from the project, there will be no negative impacts to the values and functions of the total wetland complex.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

The proposed work will not impact any sites included in, or eligible for inclusion in, the National Register of Natural Landmarks.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

The proposed work will not impact any areas named in acts of congress or presidential proclamations such as those described above.

20. The degree to which a project redirects water from one watershed to another.

The proposed work will not redirect water from one watershed to another.

Additional comments

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: September 19, 2018

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Sarah Large
Ron Crickard
Doug Locker
Tim Boodey
Ron Kleiner
Tobey Reynolds
Stephanie Micucci
Richard Faul
Victoria Chase
Marc Laurin
Meli Dube
Wendy Johnson
Mose Jones-Yellin

ACOE

Mike Hicks

EPA

Mark Kern

NHDES

Gino Infascelli
Lori Sommer
Jessica Bouchard
Andrew Madison

NHF&G

Carol Henderson

NHB

Amy Lamb

**Consultants/Public
Participants**

Rich Fixler
Laura Canham
Christine Perron
Josh Lund
David McNamara
John Stockton
Noah Elwood
Pete Walker
Lindsay Matras
Marty Kennedy

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

August 15, 2018 Minutes to be finalized at October 17, 2018 meeting.....	2
Eaton, #41864.....	2
Keene, #15854.....	3
Manchester-Boston Regional Airport Airfield Geometry Review.....	4
Gilford, #21107.....	6
Portsmouth, #15731 (A000(909)).....	8
Lebanon, #15717 (X-A000(906)).....	10
Jaffrey, #16307 (X-A001(234)).....	11
Warner, #40512 (X-A004(710)).....	13

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

Warner, #40512 (X-A004(710))

Stephanie Micucci, NHDOT Highway Design, provided an overview of the project location and scope. The project is located on Interstate 89 north and south from MM 16.6 to MM 20.5, including the ramps at Exits 8 and 9. The proposed work is a 4R project which includes pavement rehabilitation, guardrail replacement, rock slope work, tree clearing, bridge joint repair and/or replacement and drainage improvements. The project is anticipated to be constructed during the 2019 and 2020 construction seasons. There are several wetland resources in the project area including palustrine wetlands located in roadside ditches and on the highway embankments, forested wetlands located on the highway embankments and riverine systems including several perennial and intermittent streams as well as the Warner River, which is a newly designated river. There are no wetland impacts anticipated due to the bridge or rock slope work, temporary impacts are anticipated for tree clearing and minor impacts are anticipated for guardrail work. Work on the drainage system associated with I89 will involve impacts to various wetland types and will include resetting or replacing end sections of small circumference pipes, re-grading existing ditch lines, headwall repair or replacement, underdrain replacement, ditch line catch basin replacement, replacing slope drain pipes, and placing stone fill at pipe outlets for scour protection.

S. Micucci described the proposed impacts to streams, as determined by Streamstats watershed areas, in more detail, which include:

1. Four Tier 1 stream crossings

- a. Tier 1 Location 1 is a 24" RCP which carries an unnamed intermittent stream under I89 southbound at MM 19.5. Proposed work at the inlet involves cleaning out accumulated material and placing stone fill. There is no work proposed at the outlet.
- b. Tier 1 Location 2 includes two 30" RCPs which carry an unnamed perennial stream under I89 southbound and northbound at MM 19. The proposed work at the southbound inlet includes cleaning out accumulated material and placing fill and/or stone on the eroded slope above the culvert. The southbound pipe outlets into a drop inlet which connects to the northbound pipe inlet and proposed work involves replacing the grate only. The proposed work at the northbound outlet involves re-grading and placing additional stone fill to prevent further erosion and eliminate the existing perched condition.
- c. Tier 1 Location 3 includes two 36" RCPs which carry an unnamed perennial stream under I89 southbound and northbound at MM 18.2. Proposed work at southbound inlet involves resetting the first section of pipe, installing a new headwall, placing stone fill on the slope above the culvert, re-grading the ditch and installing stone fill. The southbound pipe outlets into a median catch basin which also connects to the northbound pipe inlet, there is no work proposed at the catch basin. The proposed work at the northbound outlet involves repairing the existing headwall.
- d. Tier 1 Location 4 includes a 24" RCP which carries an unnamed perennial stream under I89 northbound at MM 17.6. The proposed work at the inlet involves repairing the headwall. The proposed work at the outlet involves repairing the headwall and re-grading and placing stone fill to eliminate the existing perched condition.

2. Two Tier 2 stream crossings

- a. Tier 2 Location 1 involves a 36" RCP that carries an unnamed perennial stream under I89 southbound at MM 17.8. The proposed work at the inlet involves replacing the existing headwall and re-grading the ditch and placing stone fill. The work at the outlet involves repairing the last two joints of the culvert.
- b. Tier 2 Location 2 includes two 60" RCPs which carry Barclay Brook, a perennial stream, under I89 southbound and northbound at MM16.7. The proposed work at the southbound inlet includes installing a formalized beaver deterrent fence. There is no work proposed at the southbound outlet. The proposed work at the northbound inlet involves cleaning out the

existing ditch, the existing debris gate will be left in place. There is no work proposed at the northbound outlet.

3. Two Tier 3 stream crossings
 - a. Tier 3 Location 1 involves a 84" CMP which carries Silver Brook, a perennial stream, under I89 northbound and southbound at MM19.2. This pipe was originally installed with a 1" thick bituminous invert liner. The proposed work will involve installing an additional 2-3" thick concrete invert liner, armoring the existing bank with stone fill at the inlet, repairing the existing headwall at the inlet and re-grading and placing stone fill at the outlet to eliminate the existing perched condition.
 - b. Tier 3 Location 2 involves two 84" CMPs which carry Bartlett Brook, a perennial stream, under I89 northbound and southbound at MM18.0. The pipes were originally installed with a 1" thick bituminous invert liner. The proposed work on the southbound pipe will involve repairing the headwalls at the inlet and outlet and installing a 2-3" thick concrete invert liner. The proposed work on the northbound pipe will involve repairing the headwalls at the inlet and outlet, installing a 2-3" thick concrete invert liner and re-grading and placing stone fill at the outlet to eliminate the existing perched condition.
4. There are 8 streams, which are not delineated in Streamstats, which outlet water collected from the closed drainage system. These streams do not have established drainage areas as the inlets are through catchbasins or drop inlets. Two of these locations are proposed to be slip-lined with a close-fit liner which totals approximately ¼" in thickness once cured to the inside of the existing pipe.

S. Micucci summarized the estimated approximate wetland and stream impacts associated with the work described above, which include:

1. Wetland:
 - a. Permanent: 2300 s.f.
 - b. Temporary: 3100 s.f.
2. Stream:
 - a. Channel:
 - i. Permanent: 4700 s.f.; 400 l.f.
 - ii. Temporary: 6600 s.f.; 300 l.f.
 - b. Bank:
 - i. Permanent: 4700 s.f.; 900 l.f.
 - ii. Temporary: 6600 s.f.; 700 l.f.

Total Permanent Impacts = 11,700 SF (0.27 acres)

Total Temporary Impacts = 16,300 SF (0.37 acres)

Total Estimated Impacts = 28,000 SF (0.64 acres)

Melilotus Dube, NHDOT Bureau of Environment, noted that the entire project area is within ¼ mile of the Warner River, which was recently designated as a protected river by NHDES Rivers Program. The Warner River is also a Protected Shoreland Water Body. Gino Infascelli, NHDES Wetlands Bureau, confirmed that all stream crossings within the ¼ mile buffer of the Warner River will be considered Tier 3 crossings and will require appropriate Stream Crossing forms. M. Dube asked if the 8 streams which are not on streamstats because they inlet through catchbasins, etc, would be considered crossings and require compliance with the Stream Crossing Rules. G. Infascelli confirmed that these streams are not considered crossings and compliance with the NHDES Stream Crossing Rules is not required.

M. Dube provided a description of additional environmental resources and considerations for the project including protected species, aquatic organism passage, flood resources, conservation lands, contaminated sites, invasive species and water quality. The New Hampshire Natural Heritage Bureau was consulted and

does not have any records for known populations of State or Federally protected plant species or exemplary natural communities. Records of populations of black racer and wood turtles are located in the project area. Carol Henderson, NH Fish and Game, indicated that the timing of the work alleviates concern for impacts to wood turtles. C. Henderson also noted that Kim Tuttle at NH Fish and Game would like to review exact locations of rock scaling for potential impacts to black racer nesting locations. M. Dube confirmed that this information will be shared and coordination completed. M. Dube stated that the US Fish and Wildlife Service Information for Planning and Conservation tool was consulted and that the project area is located within the ranges of the small whorled pogonia and the northern long-eared bat (NLEB). A survey for small whorled pogonia was completed during the wetland invasive species delineation and no specimens were found, therefore the Department intends to move forward with a "No Effect" finding for this species. An acoustic survey was completed for NLEB in the project area and the data is currently being processed. Appropriate consultation with the USFWS will be completed pending the survey results.

C. Henderson indicated that Silver Brook and Bartlett, both Tier 3 streams, are known to contain wild brook trout and inquired about improving aquatic organism passage at these crossings. M. Dube noted that NHFG and Trout Unlimited have performed assessments on these streams. The Silver Brook crossing has been determined to be a "complete barrier to aquatic organisms," and is considered fully incompatible to the stream's geomorphology and is currently perched at the outlet. The Bartlett Brook crossing under the southbound lane has been categorized as "reduced fish passage" and is mostly compatible with the stream's geomorphology. The Bartlett Brook crossing under the northbound lane has been categorized as a "complete barrier to aquatic organisms," is considered to be partially compatible to the stream's geomorphology and has a currently perched condition at the outlet. S. Micucci reiterated that the proposed work currently includes re-grading and placing stone fill to eliminate the perched condition at both locations described above. C. Henderson requested that creating a backwater at the outlets to improve aquatic organism passage be considered instead. S. Micucci confirmed that this can be incorporated, with the Bartlett Brook crossings as a priority. C. Henderson asked that the Design Team coordinate with John McGee at NHFG during the design of these structures. Lori Sommer, NHDES Wetlands Bureau, stated that this approach would require monitoring post construction at least yearly for up to three years.

M. Dube stated that there are several areas of floodplains and floodways associated with the Warner River throughout the project area and the Floodplain Management Coordinator at the NH Office of Strategic Initiatives has been contacted, however, due to the nature of the work which does not propose large amount of fill or change the drainage pattern in the area there is no anticipated impact to these resources. There is one conservation land managed by the Land and Water Conservation Fund and owned by the Town of Warner, which will be impacted by a temporary construction easement and coordination with the Town of Warner and the LWCF program is underway. There are several known contaminated material remediation sites within 1000' of the project area, however, there is no anticipated risk for encountering this material during construction. Limited Reuse Soils will be managed appropriately. The project area contains various Type I and Type II invasive species and an Invasive Species Management plan will be required. There is no proposed increase in impervious surface area so no permanent stormwater treatment is required, however, the total disturbance area for the project will exceed 1 acre and will therefore require coverage under the Environmental Protection Agency's National Pollutant Discharge and Elimination System's Construction General Permit. A Stormwater Pollution Prevention Plan and monitoring will be required during construction.

M. Dube re-iterated that the anticipated wetland impacts are well under 10,000 square feet, L. Sommer confirmed that no mitigation would be required for these impacts. M. Dube asked if the pipes less than 48" in diameter which would have qualified for the Routine Roadway and Railway Maintenance Permit-by-Notification prior to the designation of the Warner River could be considered exempt from mitigation. L. Sommer stated that most of the proposed work on these structures would actually be considered

maintenance of existing infrastructure and would be exempt, with the exception of areas where new stone will be placed where there is no existing stone. Additionally, the stream impacts associated with the creation of the backwatering and rip-rap re-grading to eliminate the perched condition on the Tier 3 streams will not require mitigation, however, these areas should be discussed again prior to final wetland application submission. L. Sommer inquired about ditch line clearing and cleaning, M. Dube replied that there are only a few small areas of jurisdictional impact to ditch line wetlands for guardrail and clearing work. L. Sommer requested that construction sequencing for these efforts be detailed in the application package. The mitigation proposal will be revisited and confirmed with Lori Sommer prior to the final wetland application package submission to NHDES Wetlands Bureau.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

NHDOT Warner 40512
NHDES Wetlands Bureau Standard Dredge and Fill Application
Mitigation Summary

The proposed project, including an approach for calculating mitigation, was discussed at the September 2018 Natural Resource Agency Meeting. At that time, it was anticipated that permanent impacts to delineated wetland areas would not exceed 10,000 square feet and would be exempt from mitigation. The permanent wetland impacts proposed for permitting total 4,194 square feet which does not exceed the 10,000 square foot threshold and will not require mitigation.

An approach towards mitigating for stream impacts was also discussed and it was agreed that the proposed work at both culverts carrying streams under the highway and culverts conveying stormwater runoff which outlet as stream would qualify as maintenance of existing infrastructure to the limited nature of the work. As a 4R project, the proposed work includes activities such as headwall repair, invert lining, replacement of culvert end sections and re-grading existing stone aprons or placing stone to address erosion at various pipe outlets in the project area. The re-grading and placement of stone within areas where stone was previously installed is also considered maintenance of existing infrastructure and therefore exempt from mitigation. Due to coordination with NH Fish and Game (NHFG), there is additional work proposed at both the I89 North and South crossings over Bartlett Brook for the purpose of installing fish weir structures designed to address the existing perched condition of both outlets and improve fish and other aquatic organism passage through the culverts. Due to the proposed improved condition of the crossings, this work is considered self-mitigating. Coordination with Ben Nugent, John Magee and Kim Tuttle from NHFG and Tom Ballestero from the University of New Hampshire was completed, including a site visit, to design appropriate weir structures for the stream morphology and target species including turtles and brook trout. Stream impact locations associated with the placement of new stone are detailed in the Impact Summary Table on Sheet 4 of the Wetland Impact Plans and total 753 linear feet. The Department is proposing to make an in-lieu fee payment of \$186,503.04, which includes the NHDES Administrative Cost, to the NHDES Aquatic Resource Mitigation.

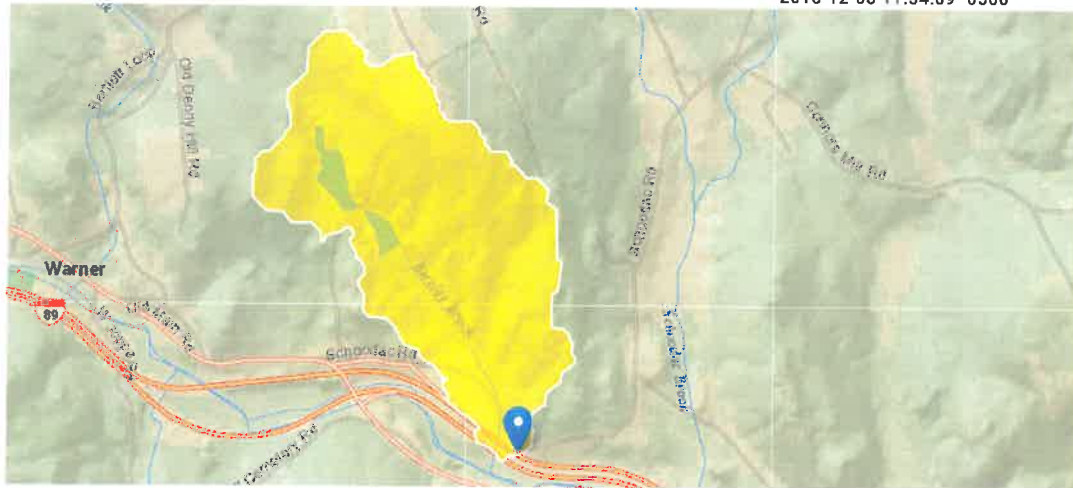
The Department contacted the Town of Warner, including the Town Administrator, Conservation Commission, Emergency Management Director, Fire Department, Police Department, Planning Board, Public Works Director, Historical Society and the Board of Selectmen on October 26, 2018. This correspondence included a request for the Town to provide the Department with a list of preferred/priority mitigation efforts that could be considered during the design process. To date, no response has been received and no mitigation priorities have been identified. The Department is also aware that the Conservation Commission shared the Department's outreach efforts with the newly appointed Warner River Local Advisory Committee, however, no input from the LAC has been received to date. The Department has also been in contact via phone and email with the Town Administrator, Jim Bingham, regarding stream impacts which will encroach on public property in the Town of Warner at Riverside Park. During the process of this coordination, Mr. Bingham did not provide any additional information regarding mitigation priorities in the Town of Warner.

**NHDES AQUATIC RESOURCE MITIGATION FUND
STREAM PAYMENT CALCULATION**

INSERT LINEAR FEET OF IMPACT on BOTH BANKS AND CHANNEL	Right Bank	262.00
	Left Bank	189.0000
	Channel	302.0000
	TOTAL IMPACT	753.0000
	Stream Impact Cost:	\$155,419.20
	NHDES Administrative cost:	
		\$31,083.84
***** TOTAL ARM FUND STREAM PAYMENT*****		
		\$186,503.04

Region ID:
Workspace ID:
Clicked Point (Latitude, Longitude):
Time:

NH
NH20181203163355844000
43.26947, -71.78098
2018-12-03 11:34:09 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.9	square miles
CONIF	Percentage of land surface covered by coniferous forest	23.6882	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.03	inches
BSLD30M	Mean basin slope computed from 30 m DEM	12.461	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	42.3376	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.1	inches
TEMP	Mean Annual Temperature	44.409	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.654	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.8	inches
ELEVMAX	Maximum basin elevation	842.625	feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.9	square miles	3.26	689
CONIF	Percent Coniferous Forest	23.6882	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.03	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	12.461	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	42.3376	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.1	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.409	degrees F	36	48.7
TEMP_06_10	Jun to Oct Mean Basinwide Temp	60.654	degrees F	52.9	64.4
PREG_06_10	Jun to Oct Gage Precipitation	17.8	inches	16.5	23.1
ELEVMAX	Maximum Basin Elevation	842.625	feet	260	6290

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM16.7, STA 914+10 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance of an existing 60" reinforced concrete pipe with masonry headwalls and a debris grate at the inlet which carries Barclay Brook under I89NB. The existing crossing has a drainage area of 595.2 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves selective tree removal at the outlet. Because the proposed work at this location is considered maintenance of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed no alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89N Culvert over Tier 1 Stream #1

Region ID:
Workspace ID:
Clicked Point (Latitude, Longitude):
Time:

NH
NH20180302133545825000
43.27341, -71.79619
2018-03-02 08:36:00 -0500



I89 North at approximately MM17.5, southern culvert of two crossings in this area.....
0.09 square miles = 57.60 acres = Tier 1 Stream Crossing

The South Carolina StreamStats application is testing LiDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.09	square miles
CONIF	Percentage of land surface covered by coniferous forest	45.7844	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.03	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	8.548	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	40.555	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.2	inches
TEMP	Mean Annual Temperature	44.42	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.656	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	18	inches
ELEVMAX	Maximum basin elevation	635.101	feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.09	square miles	3.26	689
CONIF	Percent Coniferous Forest	45.7844	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.03	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	8.548	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	40.555	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.2	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.42	degrees F	36	48.7

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM17.5, STA 956+25 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 24" reinforced concrete pipe with masonry headwalls that carries an unnamed stream under I89NB. The existing crossing has a drainage area of 58 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves resetting an 8' section of pipe at the inlet, regrading and placing stone at the outlet, and repairing both headwalls. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89N Culvert over Bartlett Brook

Region ID:

Workspace ID:

Clicked Point (Latitude, Longitude):

Time:

NH

NH20180302153740831000

43.27286, -71.80643

2018-03-02 10:37:54 -0500



I89 North at MM18.....
2.06 square miles = 1,318.4 acres = Tier 3 Stream Crossing

The South Carolina StreamStats application is testing LiDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	2.06	square miles
CONIF	Percentage of land surface covered by coniferous forest	12.3577	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.23	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	13.621	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	31.6574	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.3	inches
TEMP	Mean Annual Temperature	44.42	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.665	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	18.1	inches
ELEVMAX	Maximum basin elevation	1315.67	feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.06	square miles	3.26	689
CONIF	Percent Coniferous Forest	12.3577	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.23	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	13.621	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	31.6574	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.3	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.42	degrees F	36	48.7

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM18.0, STA 981+50 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 84" corrugated metal pipe with masonry headwalls and a perched outlet which carries Bartlett Brook under I89NB. The existing crossing has a drainage area of 1318 acres and is considered a Tier 3 stream crossing. The proposed work involves installing a concrete invert liner, minor repairs to both headwalls, removal of selected trees at the inlet, and installing a backwatering structure at the outlet. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

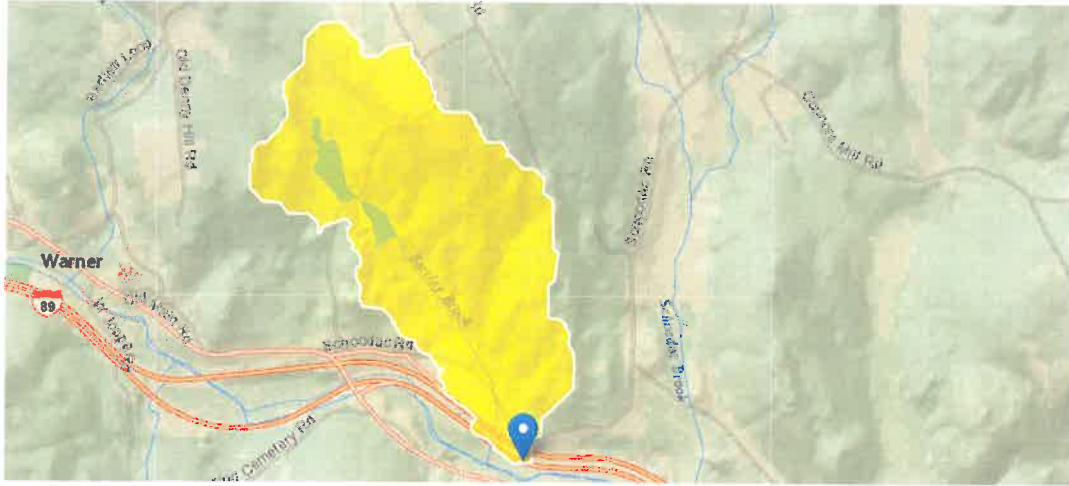
- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512 I89 SB over Barclay Brook

Region ID:
Workspace ID:
Clicked Point (Latitude, Longitude):
Time:

NH
NH20181203162827165000
43.26857, -71.78040
2018-12-03 11:28:40 -0500



I89 South at MM16.7..... 0.93 square miles = 595.2 acres = Tier 2 Stream Crossing

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.93	square miles
CONIF	Percentage of land surface covered by coniferous forest		percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.03	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM		percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest		percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.1	inches
TEMP	Mean Annual Temperature		degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period		degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.7	inches
ELEVMAX	Maximum basin elevation		feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.93	square miles	3.26	689
CONIF	Percent Coniferous Forest		percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.03	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM		percent	3.19	38.1
MIXFOR	Percent Mixed Forest		percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.1	inches	6.83	11.5
TEMP	Mean Annual Temperature		degrees F	36	48.7
TEMP_06_10	Jun to Oct Mean Basinwide Temp		degrees F	52.9	64.4
PREG_06_10	Jun to Oct Gage Precipitation	17.7	inches	16.5	23.1
ELEVMAX	Maximum Basin Elevation		feet	260	6290

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM16.7, STA 909+50 SB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance of an existing 60" reinforced concrete pipe with masonry headwalls and a debris grate at the inlet which carries Barclay Brook under I89SB. The existing crossing has a drainage area of 595 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves debris removal at the inlet and construction of a beaver deterrent fence. Because the proposed work at this location is considered maintenance of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89S Culvert over Tier 2 Stream #1

Region ID:

NH

Workspace ID:

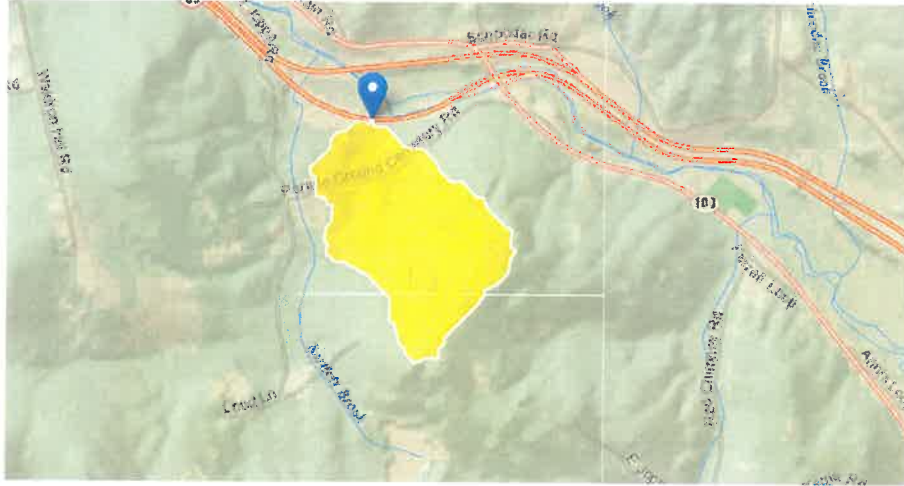
NH20180302134052883000

Clicked Point (Latitude, Longitude):

43.27025, -71.80134

Time:

2018-03-02 08:41:06 -0500



I89 South at approximately MM17.7..... 0.36
square miles = 230.4 acres = Tier 2 Stream Crossing

The South Carolina StreamStats application is testing LIDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.36	square miles
CONIF	Percentage of land surface covered by coniferous forest	9.8247	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.03	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	12.382	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	45.996	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.3	inches
TEMP	Mean Annual Temperature	44.42	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.656	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	18	inches
ELEVMAX	Maximum basin elevation	886.153	feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.36	square miles	3.26	689
CONIF	Percent Coniferous Forest	9.8247	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.03	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	12.382	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	45.996	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.3	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.42	degrees F	36	48.7

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM17.8, STA 963+85 SB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 36" reinforced concrete pipe with masonry headwalls that carries an unnamed stream under I89SB. The existing crossing has a drainage area of 230 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work at the inlet involves resetting an 8' section of pipe, installing a concrete headwall, regrading the existing ditchline, regrading side slopes, and placing stone fill. The proposed work at the outlet involves repairing the last 2 joints of the culvert and placing stone fill. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Region ID:
Workspace ID:
Clicked Point (Latitude, Longitude):
Time:

The South Carolina StreamStats application is testing LIDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	2.05	square miles
CONIF	Percentage of land surface covered by coniferous forest	12.2559	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.23	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	13.668	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	31.8117	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.3	inches
TEMP	Mean Annual Temperature	44.42	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.665	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	18.1	inches
ELEVMAX	Maximum basin elevation	1315.67	feet

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.05	square miles	3.26	689
CONIF	Percent Coniferous Forest	12.2559	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.23	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	13.668	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	31.8117	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.3	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.42	degrees F	36	48.7

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM18.0, STA 980+00 SB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 84" reinforced concrete pipe with masonry headwalls and a perched outlet that carries Bartlett Brook under I89SB. The existing crossing has a drainage area of 1312 acres and is considered a Tier 3 stream crossing. The proposed work involves installing a concrete invert liner, minor repairs to both headwalls, and installing a backwatering structure at the outlet. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89 Culvert over Tier 1 Stream#3

Region ID:

NH

Workspace ID:

NH20181203163946427000

Clicked Point (Latitude, Longitude):

43.27346, -71.80881

Time:

2018-12-03 11:40:00 -0500



I89 North and South just south of MM18.2 and the West Joppa Road Overpass 0.14 square miles = 89.6 acres =
Tier 1 Stream Crossing

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.14	square miles
CONIF	Percentage of land surface covered by coniferous forest	7.0743	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.11	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	15.31	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	34.7244	percent
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.3	inches
TEMP	Mean Annual Temperature	44.42	degrees F
TEMP_06_10	Basinwide average temperature for June to October summer period	60.656	degrees F
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	18	inches
ELEVMAX	Maximum basin elevation	843.742	feet

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.14	square miles	3.26	689
CONIF	Percent Coniferous Forest	7.0743	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.11	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	15.31	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	34.7244	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.3	inches	6.83	11.5
TEMP	Mean Annual Temperature	44.42	degrees F	36	48.7
TEMP_06_10	Jun to Oct Mean Basinwide Temp	60.656	degrees F	52.9	64.4
PREG_06_10	Jun to Oct Gage Precipitation	18	inches	16.5	23.1

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM18.2, STA 989+90 SB, STA 990+50 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 36" reinforced concrete pipe with masonry headwalls that carries an unnamed stream under I89SB and I89NB. The existing crossing has a drainage area of 70 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work at the inlet involves resetting the first section of pipe, regrading the existing ditch, adding stone fill, and installing a new headwall. The proposed work at the outlet involves repairing the headwall and placing stone fill. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

2



**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM18.7, STA 1017+60 SB, STA 1019+00 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 24" reinforced concrete pipe with a masonry headwall at the inlet and a slope failure at the outlet that carries an unnamed stream under I89SB and I89NB. The existing crossing has a drainage area of 17 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves replacing the headwall at the inlet and, at the outlet, regrading and placing stone fill. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89 Culvert over Tier 1 Stream

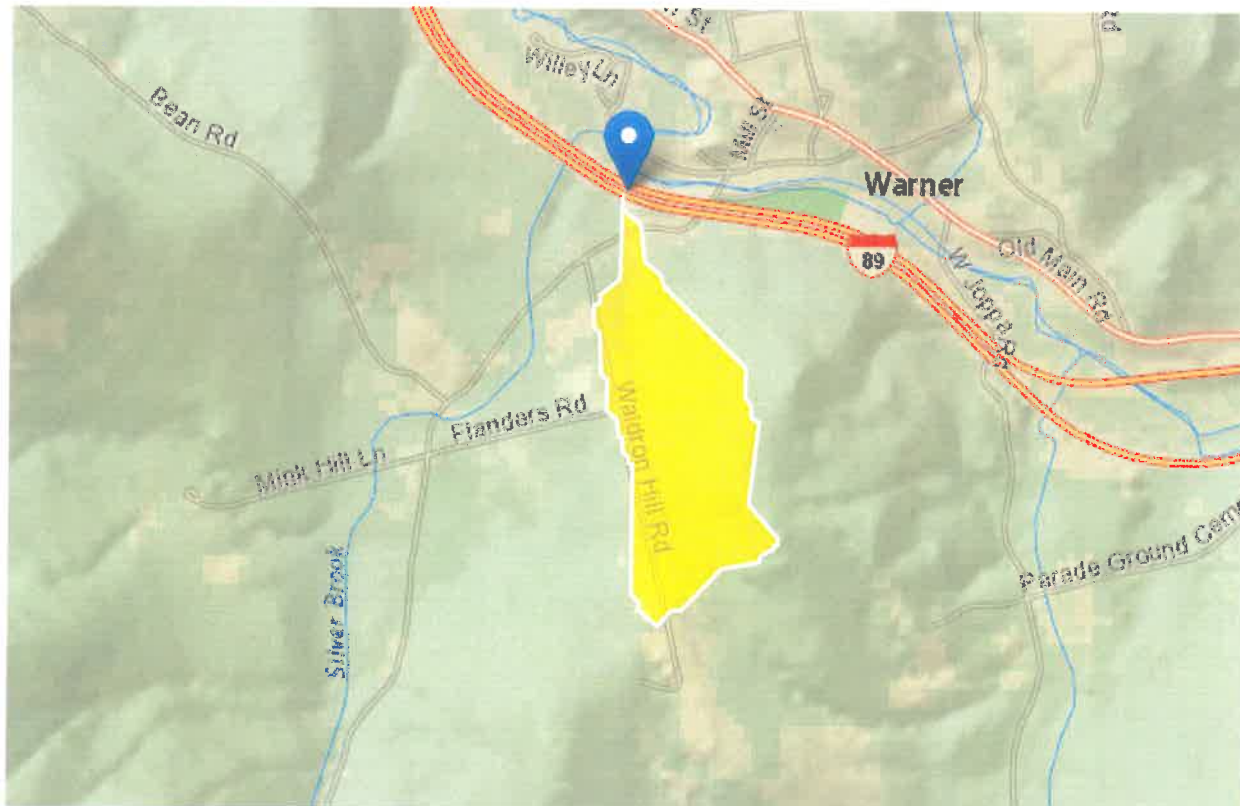
#5

Region ID: NH

Workspace ID: NH20180305125423924000

Clicked Point (Latitude, Longitude): 43.27861, -71.82482

Time: 2018-03-05 07:54:37 -0500



I89 North and South at approximately MM19 just north of the North Village Road

overpass..... 0.19 square miles = 121.6 acres = Tier 1 Stream Crossing

The South Carolina StreamStats application is testing LiDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM19.0, STA 1035+40 SB, STA 1036+40 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 30" reinforced concrete pipe with masonry headwalls that carries an unnamed stream under I89SB & I89NB. The existing crossing has a drainage area of 122 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves regrading, installing stone fill, and repairing headwalls at the inlet and outlet. Because the proposed work at this location is considered maintenance of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89 Culvert over Silver Brook

Region ID: NH

Workspace ID: NH20180305125934975000

Clicked Point (Latitude, Longitude): 43.27933, -71.82685

Time: 2018-03-05 07:59:48 -0500



I89 North and South just south of

MM19.2 2.4 square miles = 1,536
acres = Tier 3 Stream Crossing

The South Carolina StreamStats application is testing LiDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM19.2, STA 1042+25 SB, STA 1044+00 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance and repair of an existing 84" corrugated metal pipe with masonry headwalls that carries Silver Brook under I89SB & I89NB. The existing crossing has a drainage area of 1,536 acres and is considered a Tier 3 stream. The proposed work at the inlet involves installing a concrete invert-liner, removing trees above the headwall, armoring the bank with stone fill, and repairing the existing headwall. The proposed work at the outlet involves constructing a backwatering structure to eliminate the perch. Because the proposed work at this location is considered maintenance and repair of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Warner 40512: I89 Culvert over Tier 1 Stream

#6

Region ID: NH

Workspace ID: NH20180305130235387000

Clicked Point (Latitude, Longitude): 43.28352, -71.83293

Time: 2018-03-05 08:02:49 -0500



I89 North and South at approximately MM19.6.....0.05 square miles = 32 acres = Tier 1 Stream Crossing

The South Carolina StreamStats application is testing LiDAR-derived data and streams for delineation. This is a beta version and QA/QC is incomplete. It may calculate basin characteristics and flow statistics incorrectly. Please verify the drainage areas and flow stats carefully. Use at your own risk

Basin Characteristics

**NH Department of Transportation
Bureau of Highway Design
Warner, 40512: MM19.2, STA 1060+30 SB, STA 1061+80 NB
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT**

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.74 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.*)

- The proposed work involves maintenance of an existing 24” reinforced concrete pipe that carries an unnamed stream under I89SB & I89NB. The existing crossing has a drainage area of 32 acres but is considered a Tier 3 stream crossing due to proximity to the Warner River. The proposed work involves cleaning out accumulated material at the inlet and outlet, regrading the ditches and placing stone fill. Because the proposed work at this location is considered maintenance of an existing Tier 3 stream crossing and will therefore not meet the requirements for replacement detailed in Env-Wt 904.04, the Department is pursuing an Alternative Design.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the maximum extent practicable, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

- The proposed work meets the intent of the NH Stream Crossing Guidelines to the maximum extent practicable, as discussed below. A compliant design is not proposed because replacement of the crossing, as required by Env-Wt 904.05, is beyond the scope of this project.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

- The condition through the crossing is not proposed to change, as the existing concrete culvert will remain in place.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

- The existing vegetated bank will remain in place, and any disturbed areas resulting from the proposed work will be stabilized and the vegetation reestablished prior to the completion of construction.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

- There is no proposed change to the alignment and gradient of the existing crossing, flow regime, or floodplain.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

- There is no proposed alteration to the flow pattern or quantity, and no change to the hydraulic capacity of the crossing. Therefore, abutting properties will not experience an increase in flood stages and the sediment transport characteristics will not adversely affect channel stability.

(f) To simulate a natural stream channel.

- The existing condition of the stream crossing will not change, so the crossing's resemblance to a natural stream channel will neither increase nor diminish.

(g) So as not to alter sediment transport competence.

- The proposed work will not alter the stream crossing's sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01

(a) Not be a barrier to sediment transport;

- The proposed work will not alter the stream crossing's sediment transport competence.

(b) Prevent the restriction of high flows and maintain existing low flows;

- The proposed work will not alter the stream crossing's ability to maintain high and low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

- The proposed work will not alter the stream crossing's ability to accommodate the movement of indigenous aquatic life beyond the duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

- The proposed work will not cause an increase in the frequency of flooding or overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

- The proposed work will preserve the existing watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

- The proposed work will not alter the existing watercourse connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

- The use of erosion control measures during construction, and the stabilization of disturbed areas, will ensure that there is no erosion, aggradation, or scour as a result of the proposed work.

(h) Not cause water quality degradation.

- The proposed work will prolong the functioning of the existing drainage system and maintain current water quality levels.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

Memo



NH NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Melilotus Dube, New Hampshire Department of Transportation
7 Hazen Drive
Concord, NH 03301

From: Amy Lamb, NH Natural Heritage Bureau
Date: 3/5/2018 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau

NHB File ID: NHB18-0700

Town: Warner

Location: Interstate 89 North and South from
MM16.6 to MM20.5

Description: NHDOT Warner 40512. The proposed 4R project involves repair and rehabilitation of I89 roadway. This work will include pavement reclaim and resurfacing, replacement of expansion joints at bridges, rock scaling and associated tree clearing, right-of-way fence repair or replacement and associated tree clearing, guardrail replacement and extension with new end units, lining of large cross culverts and replacement of small slope pipes and underdrain.

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: Please contact the NH Fish & Game Department to address wildlife concerns.

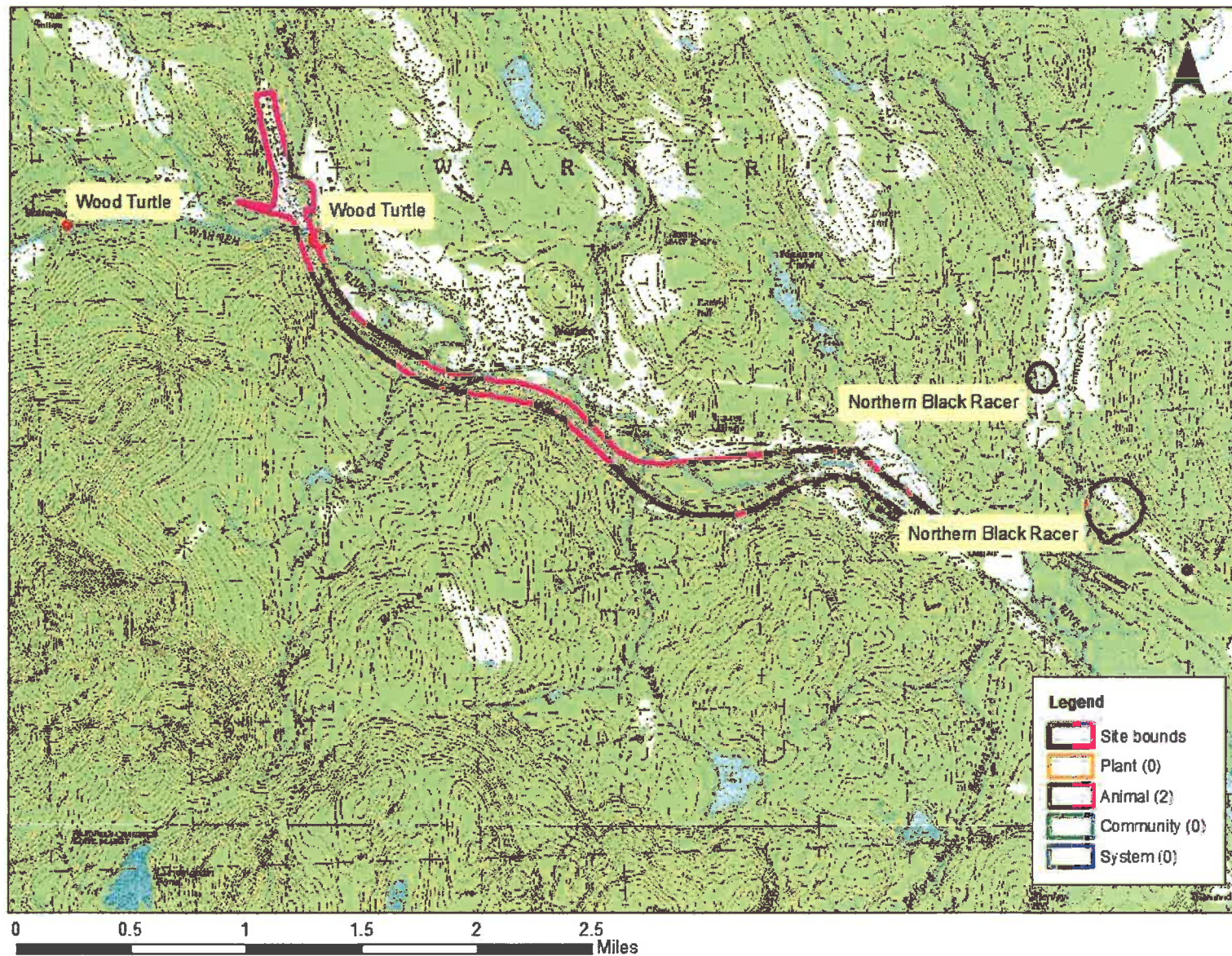
Vertebrate species	State ¹	Federal	Notes
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (<i>Glyptemys insculpta</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

NHB18-0700



New Hampshire Natural Heritage Bureau - Animal Record

Northern Black Racer (*Coluber constrictor constrictor*)**Legal Status**

Federal: Not listed
State: Listed Threatened

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2012: Area 13014: Collected shed skin of adult, 4' long.2009: Area 12292: 1 observed. Area 12358: 1 observed.2006: Area 11714: 1 adult seen.

General Area: 2012: Area 13014: Shed skin collected in garden of residential yard.2009: Area 12292: In field, moving into dense cover (juniper/brush pile). Area 12358: Under wheelbarrow in structure.2006: Area 11714: Under deck of house.

General Comments:
Management
Comments:

Location

Survey Site Name: Poverty Plains Road, Warner
Managed By: Courser 3

County: Merrimack
Town(s): Warner
Size: 40.1 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2012: Area 13014: 374 Schoodac Road, Warner.2009: Area 12292: Field on Poverty Plains Road, Warner. Area 12358: 114 Poverty Plains Road, Warner.2006: Area 11714: Poverty Plains Road, Warner.

Dates documented

First reported: 2006-07-10

Last reported: 2012-07-21

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)**Legal Status**

Federal: Not listed
State: Special Concern

Conservation Status

Global: Rare or uncommon
State: Rare or uncommon

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:

Detailed Description: 2000: 1 adult male hit on road (Obs_id 2000.015). 1997: 6 adults and young observed.
General Area: 1997: Riverine corridor with cobble substrate, banks and bars of cobble, and some sand. Clear water with bank undercuts but near-zero instream cover. Excellent riparian habitat. Extensive floodplain.
General Comments: 1997: Observed by David Carroll.
Management: 1997: ATV access to shoals and cobble bars at time of low water.
Comments:

Location

Survey Site Name: Warner River, Stevens Brook
Managed By:

County: Merrimack
Town(s): Warner
Size: 3.3 acres Elevation: 510 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2000: At Covered Bridge on Waterloo Rd. in Warner. 15 Plus years old (Obs_id 2000.015). 1997: [From Warner, take Rte. 103 west for ca. 1.0 miles. Just before the I-89 overpass, park and follow Stevens Brook south.] Site is at confluence of Stevens Brook and Warner River, to ca. 150 meters downstream.

Dates documented

First reported: 1997-09 Last reported: 2000-06-01

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

Dube, Melilotus

From: Tuttle, Kim
Sent: Monday, October 08, 2018 9:37 AM
To: Dube, Melilotus
Subject: RE: NHDOT Warner 40512 NHFG Coordination NHB18-0700
Attachments: SnakeFlyer_FinalVersion.pdf

Mei,

The NHFG Nongame and Endangered Wildlife Program has reviewed NHB18-0700 for potential impacts to the state threatened black racer. It is our understanding that the perennial stream culverts will be reviewed separately, mainly by the NHFG Inland Fisheries Division. We have no knowledge of black racer dens in the vicinity of the ledges to be scaled back. However, there is a potential for dens in ledge habitat.

Attached is the black racer flyer so that construction personnel may become familiar with the different patterning of the young of this species as well as with the adults. As in all these jobs, avoid the use of welded plastic or 'biodegradable plastic' netting or thread in erosion control matting, if needed. There are numerous documented cases of snakes and other wildlife being trapped and killed in erosion control matting with synthetic netting. Several 'wildlife friendly' options such as woven organic material (e.g., coco matting) are commercially available.

If a black racer is found in a work area from November through the winter months, work shall immediately cease and the incident shall be immediately reported to the NHFG Department (Brendan Clifford 603-271-0463 or Melissa Doperalski 603-271-1738) as their presence likely indicates a hibernaculum. Black racers den communally so the sighting of an individual during denning season is indicative of more individuals at the site.

All observations of northern black racer snakes encountered from the end of September through the month of April must be immediately reported to the NHFG Department (Brendan Clifford 603-271-0463 or Melissa Doperalski 603-271-1738) as their presence likely indicates a hibernaculum in the vicinity.

Thanks,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
11 Hazen Drive
Concord, NH 03301
603-271-6544

From: Dube, Melilotus
Sent: Friday, October 5, 2018 11:13 AM
To: Tuttle, Kim
Subject: RE: NHDOT Warner 40512 NHFG Coordination

Kim,

Please see the attached maps and plans showing the rock scaling areas. We usually clear trees 10-12 feet back from the edge of the face above the scaling locations. I do not know the timing as there is a lot of work proposed on this project over the 2 seasons. If there is a particular time of year restriction that you would need implemented, it would be easier

to dictate that in the environmental commitments as we have no way of knowing what the potential contractor's schedule would look like right now.

Please let me know if you need any other information regarding the ledge work.

Thank you!

Meli

From: Tuttle, Kim

Sent: Tuesday, September 18, 2018 2:03 PM

To: Dube, Melilotus

Cc: Magee, John; Nugent, Benjamin

Subject: RE: NHDOT Warner 40512 NHFG Coordination

Hello Meli,

The NHFG Nongame Program and the Inland Fisheries Division would likely want to review the repair/rehab of large culverts conveying water under I89 in Warner if they are perennial streams tributary to the Warner River for wood turtle and eastern brook trout passage and as the River was recently protected as a Designated River. The Nongame Program would also be interested in seeing an aerial of the areas proposed for rock scaling and to know the timing for it as we would evaluate these areas for northern black racer dens. Whenever you have more details on these aspects of the job, please let us know.

Thanks,

Kim Tuttle

Wildlife Biologist

NH Fish and Game

11 Hazen Drive

Concord, NH 03301

603-271-6544

From: Dube, Melilotus

Sent: Friday, September 14, 2018 10:59 AM

To: Tuttle, Kim

Subject: NHDOT Warner 40512 NHFG Coordination

Good morning Kim,

I am reviewing a highway repair and rehabilitation project on I89 in Warner and the NHB search came up with a couple NHFG records. Please see attached NHB letter and maps. The project begins at MM 16.6 and extends northerly to MM 20.5, including both the north and south barrels and Exits 8 and 9. The proposed work includes resurfacing, minor bridge repairs, guardrail replacement, rock scaling, tree clearing, right-of-way fence repairs/replacement, repair/rehab of large culverts conveying water under the roadway and replacement/repair/rehab of the closed drainage system and other small drainage structures including underdrain, slope pipes and catch basins. All work is being kept within the I89 controlled access ROW.

The NHB report indicated that there are records for northern black racer and wood turtle in the project area. Do you have any anticipated concerns based on the broad scope provided above? Due to the long nature of this project and the number of structures involved, I don't have specific locations of work right now. Wetland plans are being developed which we could review later if you have location-specific concerns.

Thank you,



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>



In Reply Refer To:

November 19, 2018

Consultation Code: 05E1NE00-2018-SLI-1178

Event Code: 05E1NE00-2019-E-00804

Project Name: Warner 40512

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-1178

Event Code: 05E1NE00-2019-E-00804

Project Name: Warner 40512

Project Type: TRANSPORTATION

Project Description: The proposed project involves repair and rehabilitation of the roadway and appurtenances on Interstate 89 North and South from MM16.6 to MM20.5 in the Town of Warner. The proposed work includes pavement reclaim and resurfacing, guardrail replacement including extensions and new end units, rock scaling, right-of-way fence repair and replacement, replacement of expansion joints on bridges and drainage work including lining of large pipes under the highway and replacement of small slope pipes and underdrain.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/43.282475231358895N71.83227546816143W>



Counties: Merrimack, NH

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Small Whorled Pogonia <i>Isotria medeoloides</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Dube, Melilotus

From: vonOettingen, Susi <susi_vonoettingen@fws.gov>
Sent: Tuesday, November 20, 2018 3:43 PM
To: Dube, Melilotus
Subject: Re: [EXTERNAL] NHDOT Warner 40512 NLEB Consultation

Hi,

So sorry to hear about Echoclass, what a mess.

I can probably get this done sooner since my response is a form letter. In fact, I can draft it before the holiday and when the hard copy comes in, I'll just change the date and get it going.

I know SWP isn't in that area since I found it in our town, but no where near the highway (in my back yard actually). Wrong habitat.

Anyway, I'll do my best to turn this around quickly.

Susi

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(W) 603-227-6418
(Fax) 603-223-0104

www.fws.gov/newengland

On Tue, Nov 20, 2018 at 9:20 AM Dube, Melilotus <Melilotus.Dube@dot.nh.gov> wrote:

Good morning Susi,

Please find the attached documents for the NLEB consultation for the Warner 40512 project that we did an acoustic survey for this summer. There is approximately 4 acres of tree clearing proposed, 3.75 of which is located in the median for sight distance clearing and the remainder of which is associated with drainage work access and rock scaling activities. We anticipate that clearing activities will occur during both the active and inactive seasons.

Please note that we have been unable to get EchoClass to work for several months now and have delayed submitting this consultation in hopes of being able to use the program. At this time, we are faced with a very tight timeframe for completing consultation and so we ran the call data through SonoBat and Kaleidoscope Pro. SonoBat indicated NLEB absence while Kaleidoscope Pro indicated NLEB presence in the project area, I

am attaching an email from Rebecca giving some details of the findings but no official report has been generated yet. At this time we are assuming NLEB presence and have submitted the project for review through the IPAC consultation key as a May Affect, Likely to Adversely Affect project. Another note about the submittal is that since the proposed bridge work is limited to plug joint replacement, I completed the key as though there is no bridge work due to the your previous determination that plug joint replacements will have no effect on NLEB. Of course please let me know if this was the wrong approach, it just seemed like the best way to convey the low risk associated with that activity at the time that I was going through the key.

The Species List also indicates small-whorled pogonia. A survey for this plant was performed during the wetland/invasive delineations and none were found within the project area. This was discussed at the September Natural Resource Agency Meeting with no concern from NHHNB.

I understand that the standard review time for the MA-LAA projects is 30 days, however, I am wondering if you are able to review this one sooner if at all possible. We have been delaying submitting in hopes of getting EchoClass working but it seems that all our efforts have been fruitless to this point, hopefully it will work in the future. If you are able to review sooner, I really appreciate it but if not of course I completely understand that the 30 days is standard.

I am putting hard copies of all these documents in the mail today.

Thank you!

Meli

Melilotus M. Dube

Environmental Manager

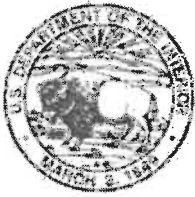
NHDOT Bureau of Environment

7 Hazen Drive

Concord, NH 03301

(603) 271-1612

NEW EMAIL: Melilotus.Dube@dot.nh.gov



United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
<http://www.fws.gov/newengland>



January 8, 2018

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

<http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm> (accessed January 2018)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact David Simmons of this office at 603-227-6425 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

See email correspondence with Susi von Oettingen, USFWS New England Field Office Endangered Species Biologist, dated November 20, 2018 stating that small-whorled pogonia (SWP) is not located in the project area.
Meli Dube, NHDOT Environmental Manager, 12/3/18



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>

IPaC Record Locator: 512-14661557

November 19, 2018

Subject: Consistency letter for the 'Warner 40512' project (TAILS 05E1NE00-2018-R-1178) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **Warner 40512** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, and is likely to adversely affect the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

This "may affect - likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative uses it to ask the Service to rely on the PBO to satisfy the agency's consultation requirements for this project. Please provide this consistency letter to the lead Federal action agency or its designated non-federal representative with a request for its review, and as the agency deems appropriate, transmittal to this Service Office for verification that the project is consistent with the PBO.

This Service Office will respond by letter to the requesting Federal action agency or designated non-federal representative within 30 calendar days to:

- verify that the Proposed Action is consistent with the scope of actions covered under the PBO;

- verify that all applicable avoidance, minimization, and compensation measures are included in the action proposal;
- identify any action-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements of the PBO, and
- identify anticipated incidental take.

ESA Section 7 compliance for this Proposed Action is not complete until the Federal action agency or its designated non-federal representative receives a verification letter from the Service.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency for the Proposed Action accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Small Whorled Pogonia, *Isotria medeoloides* (Threatened)

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

Warner 40512

Description

The proposed project involves repair and rehabilitation of the roadway and appurtenances on Interstate 89 North and South from MM16.6 to MM20.5 in the Town of Warner. The proposed work includes pavement reclaim and resurfacing, guardrail replacement including extensions and new end units, rock scaling, right-of-way fence repair and replacement, replacement of plug joints on bridges and drainage work including lining of large pipes under the highway and replacement of small slope pipes and underdrain.

No documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31.

Yes, I verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted during this period.

9. You have indicated that the following Avoidance and Minimization Measures (AMMs) will be implemented as part of the proposed project:

- *General AMM 1*
- *Lighting AMM 1*
- *Tree Removal AMM 1*
- *Tree Removal AMM 3*

Avoidance And Minimization Measures (AMMs)

These measures **were accepted** as part of this determination key result:

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

TREE REMOVAL AMM 1

Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to avoid tree removal.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's [February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects](#). The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

Dube, Melilotus

From: Ryan, Kerry
Sent: Tuesday, October 16, 2018 10:21 AM
To: Dube, Melilotus
Subject: FW: [EXTERNAL] Bridge Plug Joints and the Highway Maintenance Letter

From: Martin, Rebecca
Sent: Thursday, July 05, 2018 7:38 AM
To: Dube, Melilotus; Ryan, Kerry
Cc: Crickard, Ronald; Laurin, Marc
Subject: FW: [EXTERNAL] Bridge Plug Joints and the Highway Maintenance Letter

Good morning,

Susi agrees that bridge joint replacements would have no effect on NLEB and is going to ask for this work to be added to the Highway Maintenance Letter.

Thank you,
Rebecca

From: vonOettingen, Susi [mailto:susi_vonoettingen@fws.gov]
Sent: Monday, July 2, 2018 2:33 PM
To: Martin, Rebecca
Subject: Re: [EXTERNAL] Bridge Plug Joints and the Highway Maintenance Letter

Hi,

I'll bring this up to the endangered species staff and we can add this to the letter. I would agree, no effects should be anticipated.

Susi

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(W) 603-227-6418
(Fax) 603-223-0104

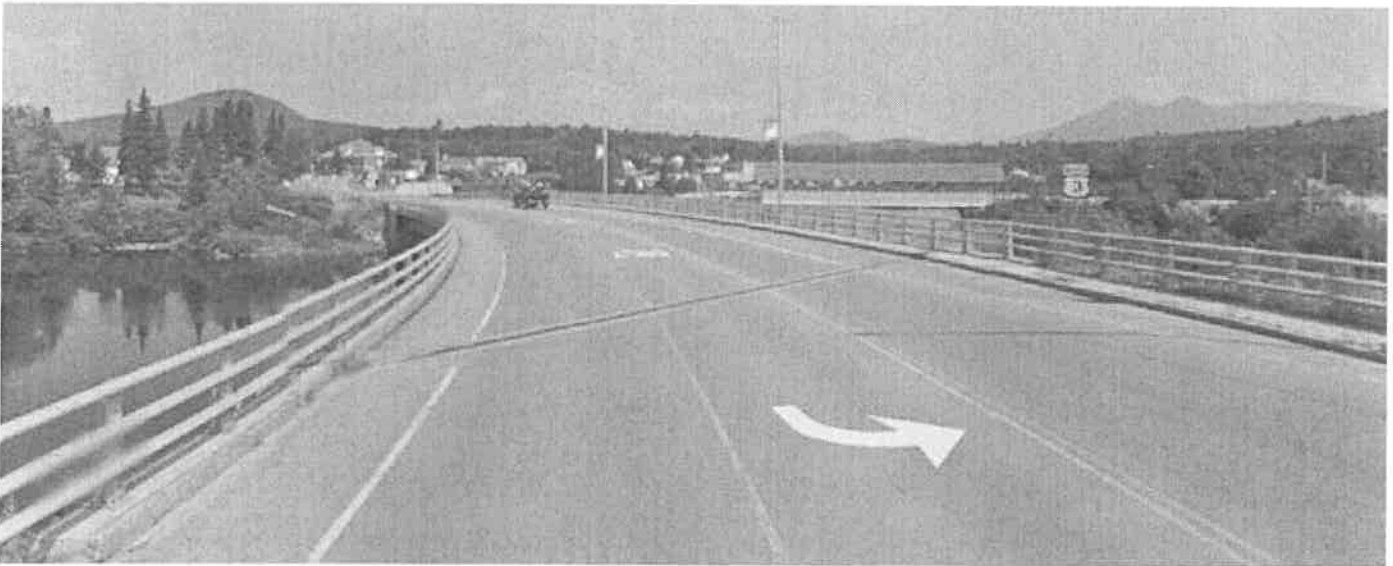
www.fws.gov/newengland

On Wed, Jun 27, 2018 at 7:39 AM, Martin, Rebecca <Rebecca.Martin@dot.nh.gov> wrote:

Hello Susi,

The Bureau of Environment recently received a group of new paving/resurfacing projects to review. The projects also include bridge joint replacements this year. These expansion joints/movement joints are designed to safely absorb the heat-induced expansion and contraction of construction materials, to absorb vibration, to hold parts together, or to allow movement. The work is pretty minor in nature, they remove the existing material from above and then put in a new one. As with the grinding of the pavement when they are resurfacing, these bridge joint replacements do include some noise that would be above ambient/traffic levels. However, they are finished quite quickly.

Here is an example:



Since there are no impacts below the deck (under the bridge), we were wondering if it is appropriate to include these resurfacing projects with bridge joints in the highway maintenance letter?

https://www.fws.gov/newengland/pdfs/highway_maintenance_ltr_2018.pdf

Thank you,

Rebecca Martin



United States Department of the Interior

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<http://www.fws.gov/newengland>



December 20, 2018

Melilotus Dube
Bureau of Environment
NH Department of Transportation
7 Hazen Drive, P.O. Box 483
Concord, New Hampshire 03302-0483

Re: NH DOT Warner, X-A004(422), 40512
TAILS: 05E1NE00-2018-F-1178

Dear Ms. Dube:

The U.S. Fish and Wildlife Service (Service) is responding to your request, dated November 19, 2018, to verify that the New Hampshire Department of Transportation (NHDOT) Warner, X-A004(422), 40512 Project (Project), for the repair and rehabilitation of Interstate 89 in the Town of Warner, New Hampshire may rely on the December 15, 2016. Programmatic Biological Opinion (BO) for federally funded or approved transportation projects that may affect the northern long-eared bat (*Myotis septentrionalis*) (NLEB). We received your request and the associated LAA Consistency Letter on November 26, 2018. This letter provides the Service's response as to whether the Federal Highway Administration may rely on the BO to comply with section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; U.S.C. 1531 *et seq.*) for the Project's effects to the NLEB.

The NHDOT, as the non-Federal agency representative for the Federal Transportation Agency, has determined that the Project may affect, and is likely to adversely affect the NLEB. The project repairs and rehabilitation of I-89 include pavement reclaim and resurfacing, guardrail replacement, rock sealing, right-of-way fence repair and replacement, replacement of expansion joints on bridges, and drainage work. Approximately 4 acres of tree clearing will occur, which may be implemented during the bat active season.

NHDOT also determined the Project may rely on the programmatic BO to comply with section 7(a)(2) of the ESA, because the Project meets the conditions outlined in the BO and all tree clearing related to the proposed work will occur farther than 0.25 mile from documented roosts and farther than 0.5 mile from any known hibernacula. The Service reviewed the LAA Consistency Letter and concurs with NHDOT's determination. This concurrence concludes your ESA section 7 responsibilities relative to this species for this Project, subject to the Reinitiation Notice below.

Conclusion

The Service has reviewed the effects of the proposed Project, which include the NHDOT's commitment to implement the impact avoidance, minimization, and compensation measures as indicated on the LAA Consistency Letter. We confirm that the proposed Project's effects are consistent with those analyzed in the BO. The Service has determined that the Project is consistent with the BO's conservation measures, and the scope of the program analyzed in the BO is not likely to jeopardize the continued existence of the NLEB. In coordination with your agency, the Federal Highway Administration, and the other sponsoring Federal Transportation Agencies, the Service will reevaluate this conclusion annually in light of any new pertinent information under the adaptive management provisions of the BO.

Incidental Take of the Northern Long-eared Bat

The Service anticipates that tree removal associated with the proposed Project will cause incidental take of the NLEB. However, the Project is consistent with the BO, and such projects will not cause take of NLEBs that is prohibited under the final 4(d) rule for this species (50 CFR §17.40(o)). Therefore, this taking does not require exemption from the Service.

Reporting Dead or Injured Bats

The NHDOT, the Federal Highway Administration, its State/local cooperators, and any contractors must take care when handling dead or injured NLEBs that are found at the project site, in order to preserve biological material in the best possible condition and to protect the handler from exposure to diseases, such as rabies. Project personnel are responsible for ensuring that any evidence about determining the cause of death or injury is not unnecessarily disturbed. Reporting the discovery of dead or injured listed species is required in all cases to enable the Service to determine whether the level of incidental take exempted by this BO is exceeded, and to ensure that the terms and conditions are appropriate and effective. Parties finding a dead, injured, or sick specimen of any endangered or threatened species must promptly notify the Service's New England Field Office.

Reinitiation Notice

This letter concludes consultation for the proposed Project, which qualifies for inclusion in the BO issued to the Federal Transportation Agencies. To maintain this inclusion, a reinitiation of this project-level consultation is required where the Federal Highway Administration's discretionary involvement or control over the Project has been retained (or is authorized by law) and if:

1. new information reveals that the Project may affect listed species or critical habitat in a manner or to an extent not considered in the BO;
2. the Project is subsequently modified in a manner that causes an effect to listed species or designated critical habitat not considered in the BO; or
3. a new species is listed or critical habitat designated that the Project may affect.

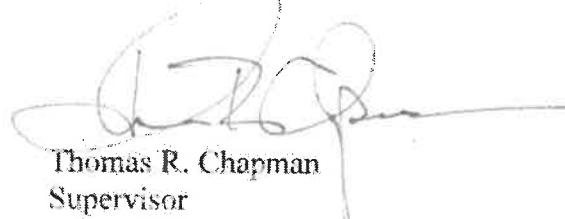
In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation.

Melilotus Dube
December 20, 2018

3

We appreciate your continued efforts to ensure that this Project is fully consistent with all applicable provisions of the BO. If you have any questions regarding our response, or if you need additional information, please contact Susi von Oettingen of this office at 603-227-6418.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'T. Chapman', with a long horizontal flourish extending to the right.

Thomas R. Chapman
Supervisor
New England Field Office

Appendix B Certification – Activities with Minimal Potential to Cause Effects**Date Reviewed:** 10/29/2018

(Desktop or Field Review Date)

Project Name: Warner**State Number:** 40512**FHWA Number:** X-A004(422)**Environmental Contact:** Meli Dube**DOT****Email Address:** Melilotus.Dube@dot.nh.gov**Project Manager:** Tobey Reynolds

Project Description: The proposed project involves roadway rehabilitation on Interstate 89 from MM16.6 to MM20.5 in the Town of Warner, including both north and south barrels and ramps at Exits 8 and 9. The work will include pavement reclaim and resurfacing within the existing edge of pavement, guardrail replacement and extensions and installation of new end units, rock scaling, tree clearing, right-of-way fence repair and replacement, replacement of expansion joints on bridges and drainage work including headwall repair or replacement and lining of large pipes under the highway and replacement of small slope pipes, catch basins and underdrain associated with the I89 closed drainage system.

Please select the applicable activity/activities:

Highway and Roadway Improvements	
<input checked="" type="checkbox"/>	1. Modernization and general highway maintenance <u>that may require additional highway right-of-way or easement</u> , including: h. removal of trees, as part of roadway improvements Choose an item.
<input type="checkbox"/>	2. Installation of rumble strips or rumble stripes
<input type="checkbox"/>	3. Installation or replacement of pole-mounted signs
<input checked="" type="checkbox"/>	4. Guardrail replacement, provided any extension does not connect to a bridge older than 50 years old (unless it does already), and there is no change in access associated with the extension
Bridge and Culvert Improvements	
<input checked="" type="checkbox"/>	5. Culvert replacement (excluding stone box culverts), when the culvert is less than 60" in diameter and excavation for replacement is limited to previously disturbed areas
<input type="checkbox"/>	6. Bridge deck preservation and replacement, as long as no character defining features are impacted
<input checked="" type="checkbox"/>	7. Non-historic bridge and culvert maintenance, renovation, or total replacement, <u>that may require minor additional right-of-way or easement</u> , including: a. replacement or maintenance of non-historic bridges Choose an item.
<input type="checkbox"/>	8. Historic bridge maintenance activities within the limits of existing right-of-way, including: Choose an item. Choose an item.
<input checked="" type="checkbox"/>	9. Stream and/or slope stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions)
Bicycle and Pedestrian Improvements	
<input type="checkbox"/>	10. Construction of pedestrian walkways, sidewalks, sidewalk tip-downs, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons
<input type="checkbox"/>	11. Installation of bicycle racks
<input type="checkbox"/>	12. Recreational trail construction
<input type="checkbox"/>	13. Recreational trail maintenance when done on existing alignment
<input type="checkbox"/>	14. Construction of bicycle lanes and shared use paths and facilities within the existing right-of-way

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Railroad Improvements	
<input type="checkbox"/>	15. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, provided no historic railroad features are impacted , including, but not limited to: Choose an item. Choose an item.
<input type="checkbox"/>	16. In-kind replacement of modern railroad features (i.e. those features that are less than 50 years old)
<input type="checkbox"/>	17. Modernization/modification of railroad/roadway crossings provided that all work is undertaken within the limits of the roadway structure (edge of roadway fill to edge of roadway fill) and no associated character defining features are impacted
Other Improvements	
<input type="checkbox"/>	18. Installation of Intelligent Transportation Systems
<input type="checkbox"/>	19. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements where no construction will occur
<input checked="" type="checkbox"/>	20. Rehabilitation or replacement of existing storm drains.
<input checked="" type="checkbox"/>	21. Maintenance of stormwater treatment features and related infrastructure

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.


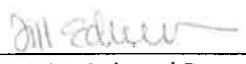
The proposed project meets the intent of Appendix B of the Section 106 Programmatic Agreement due to the restorative nature of the work which is intended to extend the functional lifespan of the existing roadway and drainage system, as well as improve safety by updating guardrail and median protections. Most of the work will remain within the previously disturbed and built highway system for Interstate 89, which is exempt from Section 106 review. The major drainage work, which is located at the base of the roadway embankments, involves culvert lining, stream channel stabilization and headwall repairs. Rock scaling in similar projects along major highways has been previously approved by the Department's Cultural Resources Program as an activity that has no potential to cause effects. No work will be undertaken in or near the Lower Warner Cemetery on the west side of RT 103 between East and West bound lanes of I-89. There are no recorded archaeological sites in the project corridor, and the nearest known site (27-M\$-140, Bald Hill Homestead) lies approximately 1500 feet (446 meters) south of the corridor.

Please submit this Certification Form along with the Transportation RPR, including photographs, USGS maps, design plans and as-built plans, if available, for review. Note: The RPR can be waived for in-house projects, please consult Cultural Resources Program Staff.

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	No
Please identify public outreach effort contacts; method of outreach and date:	Town officials, including the historical society, were contacted on October 26th, 2018, however, no response has been received to date.		

Finding: (To be filled out by NHDOT Cultural Resources Staff)

<input checked="" type="checkbox"/>	No Potential to Cause Effects	<input type="checkbox"/>	No Historic Properties Affected
This finding serves as the Section 106 Memorandum of Effect. No further coordination is necessary.			
<input type="checkbox"/>	This project does <i>not</i> comply with Appendix B. Review will continue under Stipulation VII of the Programmatic Agreement. Please contact NHDOT Cultural Resources Staff to determine next steps.		
NHDOT comments:			
 			
NHDOT Cultural Resources Staff			Date

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption a project is limited to the activities listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the New Hampshire State Historic Preservation Office, the Army Corps of Engineers, New England District, the Advisory Council on Historic Preservation, and the New Hampshire Department of Transportation Regarding the Federal Aid Highway Program in New Hampshire*. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

If any portion of the project is not entirely limited to any one or a combination of the activities specified in Appendix B (with, or without the inclusion of any activities listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.



**US Army Corps
of Engineers[®]**
New England District

**New Hampshire General Permits (GPs)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)**

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to “work” include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, special wetlands. Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www2.des.state.nh.us/nhb_datacheck/ . The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres?	X	
2.6 What is the area of the previously filled wetlands?	Unknown	
2.7 What is the area of the proposed fill in wetlands?	None	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	N/A	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index		X

3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”? (These areas are colored magenta and green, respectively, on NH Fish and Game’s map, “2010 Highest Ranked Wildlife Habitat by Ecological Condition.”) Map information can be found at: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm . • Data Mapper: www.granit.unh.edu . • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html .	X	
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the GC 21?	X	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	N/A	N/A
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 11 GC 8(d) of the GP document**	N/A	N/A

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

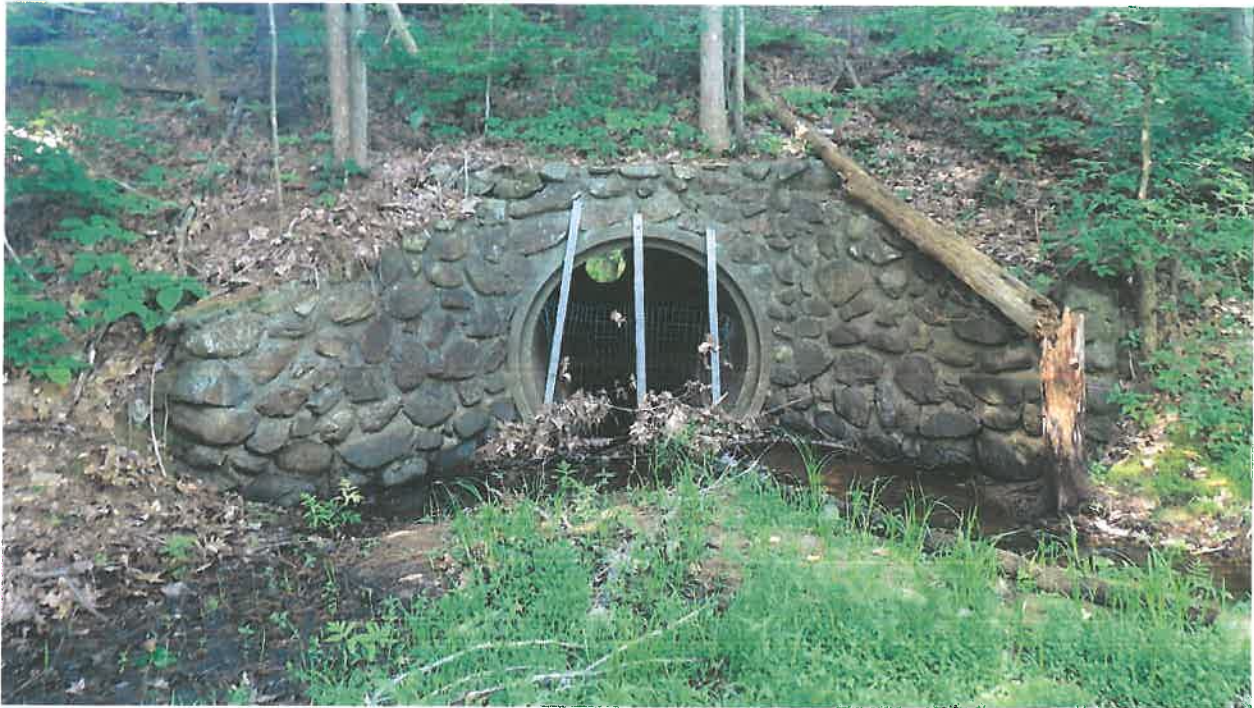


Figure 1. Impact Areas G, I and K in the median at Sta. 909+50 SB, looking downstream at the inlet of the 60" RCP carrying Barclay Brook under I89 SB (Sheet 6)



Figure 2. Impact Areas G, I and K in the median at Sta. 909+50 SB, looking upstream from the inlet of the 60" RCP carrying Barclay Brook under I89 SB (Sheet 6)



Figure 3. Impact Areas H, J and L in the median at Sta. 914+25 NB, looking upstream at the outlet of the 60" RCP carrying Barclay Brook under I89 NB (Sheet 6)



Figure 4. Impact Areas H, J and L in the median at Sta. 914+25 NB, looking downstream from the outlet of the 60" RCP carrying Barclay Brook under I89 NB (Sheet 6)



Figure 5. Impact Area M in the median at Sta. 914+75 NB, looking at the outlet of a 12" CMP conveying stormwater runoff into an emergent wetland (Sheet 6)



Figure 6. Impact Areas R and S at Sta. 948+50 SB to 951+00 SB, looking north at an emergent wetland located in a man-made ditch (Sheet 9)



Figure 7. Impact Areas O, P and Q in the median at Sta. 951+00 SB, looking upstream at the outlet of a 36" BCCMP conveying stormwater runoff and water from an emergent wetland ditch under I89 SB which combine to outlet as an unnamed perennial stream (Sheet 9)



Figure 8. Impact Areas O, P and Q in the median at Sta. 951+00 SB, looking downstream from the outlet of a 36" BCCMP conveying stormwater runoff and water from an emergent wetland ditch under I89 SB which combine to outlet as an unnamed perennial stream (Sheet 9)



Figure 9. Impact Area W at Sta. 954+00 SB, looking south at an emergent wetland located in a man-made ditch (Sheet 9)

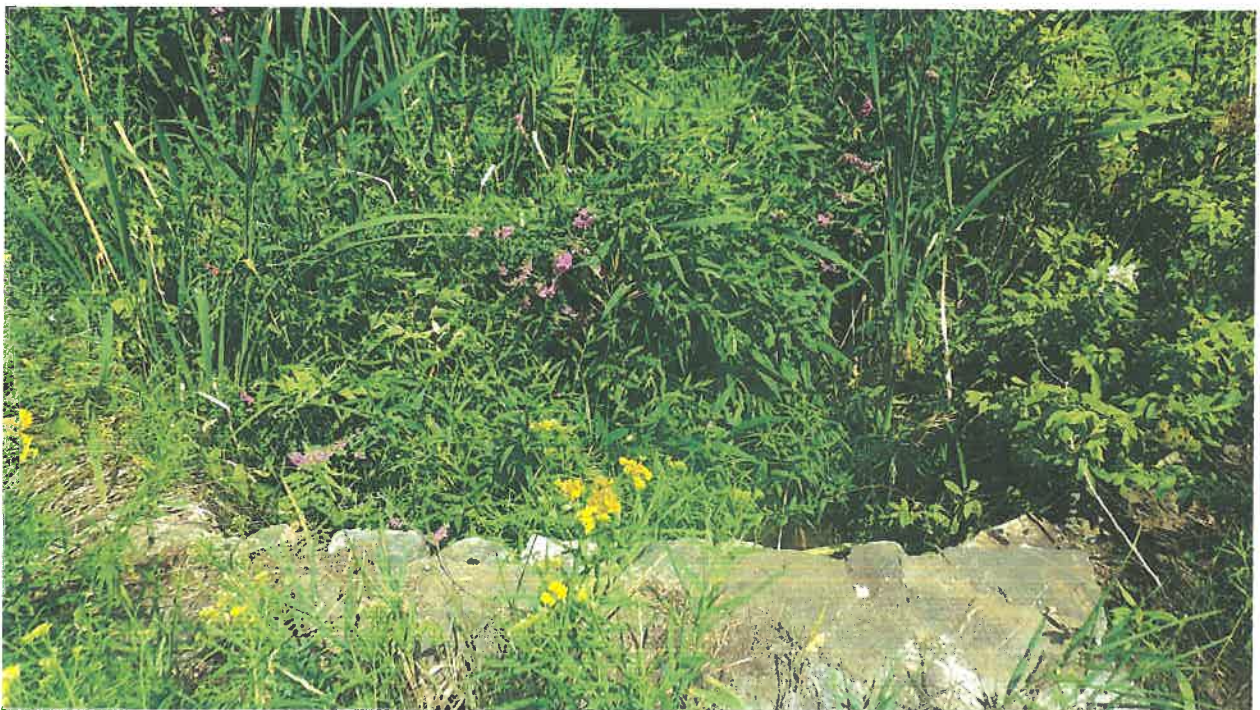


Figure 10. Impact Areas T, U and V in the median at Sta. 954+00 SB, looking downstream from the outlet of a 36" RCP conveying stormwater runoff and water from an emergent wetland ditch under I89 SB which combine to outlet as an unnamed perennial stream (Sheet 9)



Figure 11. Impact Area X in the median at Sta. 954+00 SB, looking north at an emergent wetland located in a man-made ditch (Sheet 9)



Figure 12. Impact Areas Y, Z and AA in the median at Sta. 956+25 NB, looking upstream at the outlet of a 24" RCP carrying an unnamed perennial stream under I89 NB (Sheet 10)



Figure 13. Impact Areas Y, Z and AA in the median at Sta. 956+25 NB, looking downstream from the outlet of a 24" RCP carrying an unnamed perennial stream under I89 NB (Sheet 10)



Figure 14. Impact Areas AB, AC and AD at Sta. 956+25 NB, looking downstream at the inlet of a 24" RCP carrying an unnamed perennial stream under I89 NB (Sheet 10)



Figure 15. Impact Areas AB, AC and AD at Sta. 956+25 NB, looking upstream from the inlet of a 24" RCP carrying an unnamed perennial stream under I89 NB (Sheet 10)



Figure 16. Impact Areas N and AF in the median at Sta. 966+00 NB, looking at the outlet of a 24" RCP conveying stormwater runoff under I89 NB into a scrub shrub/emergent wetland (Sheet 10)



Figure 17. Impact Area AG at Sta. 964+00 SB, looking downstream at the inlet of a 36" RCP which carries an unnamed perennial stream under I89 SB (Sheet 11)



Figure 18. Impact Areas AG and AH at Sta. 964+00 SB, looking upstream from the inlet of a 36" RCP which carries an unnamed perennial stream under I89 SB and adjacent forested wetland (Sheet 11)

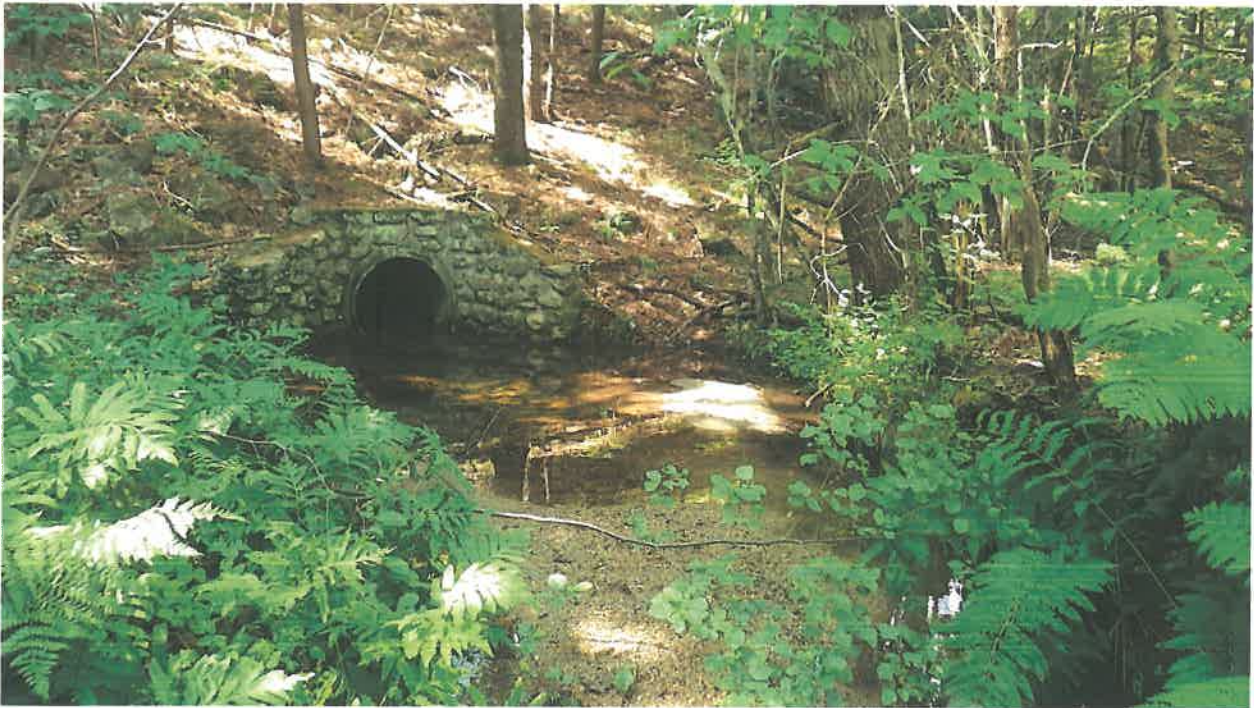


Figure 19. Impact Areas AI and AJ in the median at Sta. 963+75 SB, looking upstream at the outlet of a 36" RCP carrying an unnamed perennial stream under I89 SB (Sheet 11)



Figure 20. Impact Areas AI and AJ in the median at Sta. 963+75 SB, looking downstream from the outlet of a 36" RCP carrying an unnamed perennial stream under I89 SB (Sheet 11)



Figure 21. Impact Area C at Sta. 974+00 NB, looking at the outlet of a 12" CMP conveying stormwater runoff onto the right bank of the Warner River (Sheet 12)



Figure 22. Impact Area AK at Sta. 980+50 NB, looking at the outlet of a 12" CMP conveying stormwater runoff into a scrub shrub wetland (Sheet 12)



Figure 23. Impact Area AM in the median at Sta. 981+00 NB, looking south at the proposed clearing of selective white pines in an emergent/forested wetland (Sheet 12)



Figure 24. Impact Areas AN, AO and AP at Sta. 980+00 SB, looking downstream at the inlet of the 84" CMP carrying Bartlett Brook under I89 SB (Sheet 13)



Figure 25. Impact Areas AN, AO and AP at Sta. 980+00 SB, looking upstream from the inlet of the 84" CMP carrying Bartlett Brook under I89 SB (Sheet 13)



Figure 26. Impact Areas AQ, AR and AS in the median at Sta. 980+00 SB, looking upstream at the outlet of the 84" CMP carrying Bartlett Brook under I89 SB (Sheet 13)



Figure 27. Impact Areas AQ, AR and AS in the median at Sta. 980+00 SB, looking downstream from the outlet of the 84" CMP carrying Bartlett Brook under I89 SB (Sheet 13)



Figure 28. Impact Areas AT, AU and AV in the median at Sta. 981+75 NB, looking downstream at the inlet of the 84" CMP carrying Bartlett Brook under I89 NB (Sheet 13)



Figure 29. Impact Areas AT, AU and AV in the median at Sta. 981+75 NB, looking upstream from the inlet of the 84" CMP carrying Bartlett Brook under I89 NB (Sheet 13)



Figure 30. Impact Areas AL and AW at Sta. 981+75 NB, looking upstream at the outlet of the 84" CMP carrying Bartlett Brook under I89 NB and the surrounding scrub shrub wetland (Sheet 13)



Figure 31. Impact Areas AL and AW at Sta. 981+75 NB, looking downstream from the outlet of the 84" CMP carrying Bartlett Brook under I89 NB and the surrounding scrub shrub wetland (Sheet 13)



Figure 32. Impact Area AX at Sta. 990+25 NB, looking upstream at the outlet of a 36" RCP conveying an intermittent stream and stormwater runoff under I89 SB and NB which combine to outlet as an unnamed perennial stream (Sheet 13)



Figure 33. Impact Area AY at Sta. 990+00 SB, looking downstream at the inlet of a 36" RCP which carries an intermittent stream under I89 SB (Sheet 14)



Figure 34. Impact Area AZ at Sta. 1009+00 NB, looking downstream from the outlet of a 24" RCP which conveys stormwater runoff under I89 NB and outlets as an intermittent stream (Sheet 15)



Figure 35. Impact Area BA at Sta. 1016+00 NB, looking downstream from the outlet of an 18" RCP which conveys stormwater runoff under I89 SB and NB and outlets as an intermittent stream (Sheet 15)



Figure 36. Impact Area BB at Sta. 1017+50 SB, looking downstream at the inlet of a 24" RCP carrying intermittent stream under I89 SB and NB, also note the 18" BCCMP outletting underdrain/stormwater runoff (Sheet 15)



Figure 37. Impact Area BB at Sta. 1017+50 SB, looking upstream from the inlet of a 24" RCP carrying an intermittent stream under I89 SB and NB, also note the 18" BCCMP outletting underdrain/stormwater runoff (Sheet 15)



Figure 38. Impact Areas BC, BX and BY at Sta. 1019+00 NB, looking upstream at the outlet of a 24" RCP carrying an intermittent stream under I89 SB and NB (Sheet 15)



Figure 39. Impact Areas BC, BX and BY at Sta. 1019+00 NB, looking downstream from the outlet of a 24" RCP carrying an unnamed intermittent stream under I89 SB and NB (Sheet 15)



Figure 40. Impact Area D at Sta. 1033+00 NB, looking at the outlet of a 24" BCCMP conveying stormwater runoff onto the right bank of the Warner River (Sheet 16)



Figure 41. Impact Areas BG, BH and BI at Sta. 1035+50 SB, looking downstream at the inlet of a 30" RCP carrying an unnamed perennial stream under I89 SB and NB (Sheet 17)



Figure 42. Impact Areas BG, BH and BI at Sta. 1035+50 SB, looking upstream from the inlet of a 30" RCP carrying an unnamed perennial stream under I89 SB and NB (sheet 17)



Figure 43. Impact Areas F, BD, BE and BF at Sta. 1036+25 NB looking upstream at the outlet of a 30" RCP carrying an unnamed perennial stream under I89 SB and NB and outletting onto the right bank of the Warner River (Sheet 17)



Figure 44. Impact Areas F, BD, BE and BF at Sta. 1036+25 NB looking downstream from the outlet of a 30" RCP carrying an unnamed perennial stream under I89 SB and NB and outletting on the right bank of the Warner River



Figure 45. Impact Area BJ in the median at Sta. 1038+00 NB to Sta. 1044+50 NB, looking east at an emergent wetland located in a man-made ditch (Sheet 17)



Figure 46. Impact Areas BK, BL and BM at Sta. 1041+75 SB, looking downstream at the inlet of the 84" BCCMP carrying Silver Brook under I89 SB and NB (Sheet 17)



Figure 47. Impact Areas BK, BL and BM at Sta. 1041+75 SB, looking downstream at the inlet of the 84" BCCMP carrying Silver Brook under I89 SB and NB (Sheet 17)



Figure 48. Impact Areas BL and BK at Sta. 1041+75 SB, looking upstream at the channel and right bank of Silver Brook from the inlet of the 84" BCCMP which carries Silver Brook under I89 SB and NB (Sheet 17)



Figure 49. Impact Areas BL and BM at Sta. 1041+75 SB, looking upstream at the channel and left bank of Silver Brook from the inlet of the 84" BCCMP which carries Silver Brook under I89 SB and NB (Sheet 17)



Figure 50. Impact Areas BN, BO and BP at Sta. 1044+50 NB, looking upstream at the outlet of the 84" BCCMP carrying Silver Brook under I89 SB and NB (Sheet 17)



Figure 51. Impact Areas BN, BO and BP at Sta. 1044+50 NB, looking downstream from the outlet of the 84" BCCMP carrying Silver Brook under I89 SB and NB (Sheet 17)



Figure 52. Impact Areas BR, BZ and CA at Sta. 1060+00 SB, looking downstream at the inlet of a 24" RCP carrying an intermittent stream under I89 SB which outlets into an emergent wetland in the median (Sheet 18)



Figure 53. Impact Areas BR, BZ and CA at Sta. 1060+00 SB, looking upstream from the inlet of a 24" RCP carrying an intermittent stream under I89 SB which outlets into an emergent wetland in the median (Sheet 18)



Figure 54. Impact Area BQ at Sta. 1061+75 NB, looking at a 24" RCP which serves as an equalizer pipe between two emergent wetlands on either side of I89 NB (Sheet 18)

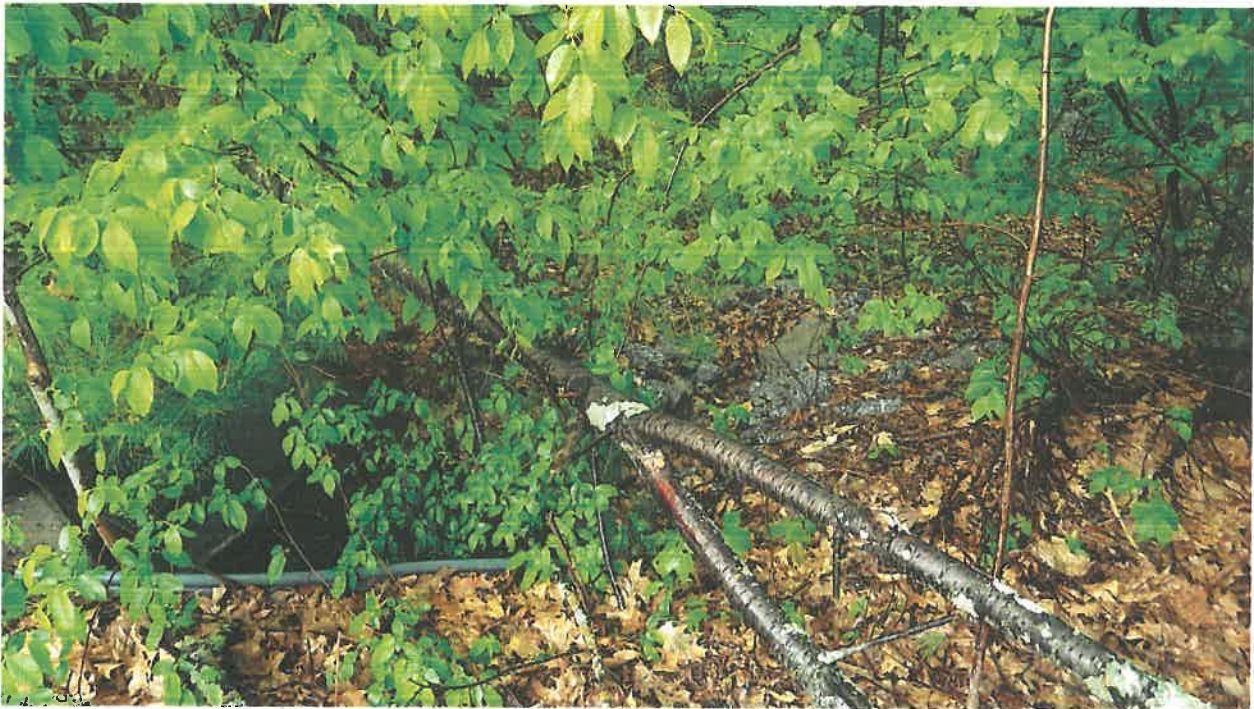


Figure 55. Impact Area BS at Sta. 1069+25 NB, looking at the outlet of a 24" RCP which conveys stormwater runoff under I89 SB and NB and outlets as an intermittent stream (Sheet 19)



Figure 56. Impact Area B at Sta. 1082+75, looking upstream at the area on the left bank of the Warner River that will be disturbed for the replacement of a 12" slope pipe outletting stormwater runoff on the western side of I89 SB from the median of I89 (Sheet 20)



Figure 57. Impact Area A in the median at Sta. 1082+50 NB, looking at the outlet of a 12" slope pipe conveying stormwater runoff onto the left bank of the Warner River (Sheet 20).



Figure 58. Impact Area BTat Sta. 3+00 on the I89 Exit 9 NB On-Ramp, looking at the outlets of two 12" BCCMPs conveying stormwater onto the bank of Stevens Brook (Sheet 21)



Figure 59. Impact Area BU at Sta. 7+75 on the I89 Exit 9 NB On-Ramp, looking at the outlets of a 12" and 18" RCP which convey stormwater runoff onto the bank of Stevens Brook (Sheet 21)



Figure 60. Impact Area BV at Sta. 10+00 on the I89 Exit 9 NB On-Ramp, looking at the outlet of a 12" pipe conveying stormwater runoff onto the bank of Stevens Brook (Sheet 21)



Figure 61. Impact Area BW at Sta. 1103+00 NB, looking upstream at the outlet of a 18" BCCMP conveying stormwater runoff under I89 SB and NB and outletting as an intermittent stream (Sheet 22)

Anticipated Project Start: August 2019
Anticipated Project Completion: Fall 2021

2019 Season (1/2 season)

1. Tree Clearing (no grubbing of stumps until 2020 and 2021 seasons)
2. Rock Slope Work:
 - a. Install traffic control barrier and erosion control BMPs.
 - b. Clear trees and brush as necessary.
 - c. Remove loose rock and debris with hand and mechanical methods.
 - d. Install rock dowels and prestressed rock bolts.
 - e. Re-establish vegetation, remove temporary erosion controls upon stabilization.

2020 Season (Southbound Barrel)

1. Install perimeter controls and define maximum work limits for grading and drainage work.
2. Cold plane full width of southbound barrel.
3. Reconstruct and replace underdrain, slope drain, and catch basins; regrade ditches.
4. Remove and regrade reclaimed asphalt in left lane (maintain traffic in right lane for up to 1 mile and 1 month at a time).
5. Fine grade reclaimed asphalt, place pavement binder course, adjust grates, and paint binder.
6. Remove existing guardrail and install new guardrail.
7. Follow steps 4 – 6 for right lane (maintaining traffic in left lane).
8. Pave full width of southbound barrel with wearing course.
9. Paint wearing course.
10. Stabilize all disturbed areas prior to winter season.

2021 Season (Northbound Barrel)

1. Install perimeter controls and define maximum work limits for grading and drainage work.
2. Cold plane full width of northbound barrel.
3. Reconstruct and replace underdrain, slope drain, and catch basins; regrade ditches.
4. Remove and regrade reclaimed asphalt in left lane (maintain traffic in right lane for up to 1 mile and 1 month at a time).
5. Fine grade reclaimed asphalt, place pavement binder course, adjust grates, and paint binder.
6. Remove existing guardrail and install new guardrail.
7. Follow steps 4 – 6 for right lane (maintaining traffic in left lane).
8. Pave full width of northbound barrel with wearing course.
9. Paint wearing course.
10. Stabilize all areas, final cleanup.

Concurrent Work (2020 & 2021 seasons)

Bridge Joint Work

1. Install perimeter/erosion control and traffic control barrier.
2. Replace/Repair bridge joints in two phases (maintain traffic in a single lane for up to 2 months per bridge).
3. Restore traffic to normal patterns at completion of bridge work.

Slope Failures, Fish Weirs, Slip Linings (during low flow)

1. Install erosion control BMPs.
2. Redirect water as necessary.
3. Install slip linings, notched fish weirs, geotextiles, and stone aprons per design.
4. Re-establish water flow.
5. Remove temporary erosion controls upon stabilization.

Ramps

1. Redirect traffic via detour routes to implement 24/7 ramp closures (closure duration varies 1 week – 2 months depending on the ramp) and install erosion control BMPs.
2. Reconstruct underdrain, slope drain, catch basins, adjust grates, and regrade ditches.
3. Excavate all pavement, full width.
4. Pave binder course, full width.
5. Adjust grates, and install/adjust granite curb.
6. Remove and replace guardrail.
7. Pave wearing course, full width.
8. Paint wearing course.
9. Remove temporary erosion controls upon stabilization and open ramps to traffic.

Steps for ditch clean up, timing unknown:

- 1) Clear all trees, knot weed/ invasive species
- 2) Place BMPs
- 3) Dig out (enough to flow)
- 4) Stabilize as needed
- 5) Place humus

Clean Water Bypass Locations:

All pipes over 36" in size will have the Water Diversion Item

For all intermittent streams:

Clean water by pass in the form of damming and pumping.

For all perennial steams:

Clean water by pass in the form of maintaining flow through the pipe is to be accomplished by way of bypass pipe.

November 21, 2018

WARNER
X-A004(422)
40512

PART WT 404 CRITERIA FOR SHORELINE STABILIZATION

Proposed stone fill for inlet and outlet protection at existing drainage pipes along the shoreline of the Warner River and within the channels and banks of streams (including Bartlett Brook and Silver Brook) will be installed within areas under the jurisdiction of the NH Wetlands Bureau and the US Army Corps of Engineers. The project also proposes stone fish weirs to eliminate the existing perch at the outlets of the Bartlett Brook and Silver Brook stream crossings for aquatic organism passage. The locations of proposed stone fill and fish weirs are shown on the attached plans.

Pursuant to PART Wt 404 Criteria for Shoreline Stabilization, the following addresses each codified section of the Administrative Rules:

Wt 404.01 Least Intrusive Method

The proposed stabilization treatments are the least intrusive construction methods necessary to minimize the disruption to the existing shorelines. The stone treatment can be reasonably constructed utilizing general highway construction methods and the construction will be done from the roadway to the greatest extent possible. The stone stabilization treatment along the slopes of the Warner River, is to prevent further erosion into the river.

Wt 404.02 Diversion of Water

The proposed roadway drainage improvements will allow stormwater runoff to be diverted such that it will flow over vegetated or stone-lined areas, insofar as possible, prior to entering the Warner River, Bartlett Brook, and Silver Brook. This will minimize erosion of the shorelines of these water bodies.

Wt 404.03 Vegetative Stabilization

- (a) Natural vegetation will be left undisturbed to the maximum extent possible. Newly developed slopes and disturbed areas will have humus and seed applied for turf establishment to help stabilize the project area.
- (b) N/A

Wt 404.04 Rip-Rap

- (a) Stone fill, as proposed throughout the project, is shown on the attached plans to protect unstable soils/embankments and to provide outlet protection for drainage crossings along the channel and banks of streams and the banks of the Warner River. Stable embankments are necessary to maintain the structural integrity of the roadway slopes during all flow conditions.
- (b) (1-5) The enclosed Section 585 specification for Stone Fill, Class B (Item 585.2) and Stone Fill, Class C (Item 585.3), provides the description of the material size, gradation, and construction requirements. Cross sections of the stone fill showing proposed thickness and other details have been provided on the attached plans. Bedding for the stone fill will consist of either:
 - Natural ground excavated to the proposed underside of the stone fill with geotextile, or
 - Newly constructed embankments consisting of suitable excavated material in conformance with Section 203 of the Specifications.

(b) (6) Enclosed are plan sheets to sufficiently indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline.

(b) (7) Stone fill is recommended for the limits shown on the enclosed plans to protect stream channels and banks, as well as the Warner River banks, from erosion during flood flows and from scour during all flows.

Diversion methods, such as temporarily re-routing stormwater runoff through downstream ditches and/or culverts, may be used to divert stormwater during construction. However, permanent diversion methods, such as the installation of new culvert crossings, are not practical for this project because new crossings would require trenching the highway. The cost associated with new culvert crossings, excavation and additional work, does not outweigh the benefit and, therefore, the installation of stone fill for erosion control is the most practical solution.

(c) N/A

(d) Stone fill for slope stabilization and outlet protection is proposed to extend adjacent to, but not within, the normal high water shoreline of the Warner River. However, stone fill for outlet protection will be located within the channel of other streams to ensure stability of the existing streambeds and banks.

(e) Engineering plans are being provided as a part of the wetland application for rip-rap in excess of 100 linear feet along the stream banks within the project limits.

SECTION 585 -- STONE FILL**Description**

1.1 This work shall consist of furnishing and placing a dense stone fill at the locations shown on the plans or ordered. Stone Fill is typically required for stability of embankment fill and soil cut slopes steeper than 2 horizontal to 1 vertical, although slopes at a flatter grade with water seepage or subject to submergence, such as in water quality treatment basins, could require stone fill. Stone fill is also used for erosion protection at pipe outlets, in drainage channels and for other drainage structures where expected water flows and velocities may require it.

Materials

2.1 Stone for stone fill shall be approved quarry stone, or broken rock of a hard, sound, and durable quality. The stones and spalls shall be so graded as to produce a dense fill with a minimum of voids.

2.1.1 Class A stone shall be irregular in shape with approximately 50 percent of the mass having a minimum volume of 12 ft³, approximately 30 percent of the mass ranging between 3 and 12 ft³, approximately 10 percent of the mass ranging between 1 and 3 ft³, and the remainder of the mass composed of spalls.

2.1.2 Class B stone shall be irregular in shape with approximately 50 percent of the mass having a minimum volume of 3 ft³, approximately 40 percent of the mass ranging between 1 and 3 ft³, and the remainder of the mass composed of spalls.

2.1.3 Class C stone shall consist of clean, durable fragments of ledge rock of uniform quality, reasonably free from thin or elongated pieces. The stone shall be made from rock which is free from topsoil and other organic material. The stone shall be graded as follows:

Sieve Size	Percentage by Weight Passing
12 in	100
4 in	50 - 90
1-1/2 in	0 - 30
3/4 in	0 - 10

2.1.4 Class D stone shall conform to Table 520-3 - Coarse Aggregate, Standard Stone Size No. 467.

2.1.5 Spalls for filling voids shall be stones or broken rock ranging downward from a maximum size of 1 ft³.

2.2 Gravel blanket material shall conform to 209.2.1.2.

2.3 Geotextile shall conform to Section 593.

Construction Requirements

3.1 Stones and spalls for stone fill shall be deposited and graded to eliminate voids and obtain a dense mass throughout the course. The spalls shall be tamped into place using an equipment bucket or other approved method.

3.1.1 When stone fill is placed on a slope, the stones shall be deposited in such a manner as not to dislodge the underlying material unnecessarily.

3.1.2 When stone fill is placed on a geotextile, it shall be deposited in a manner to maintain the integrity of the geotextile.

3.2 When gravel blanket is shown or ordered, the gravel shall be placed in layers not exceeding 12" in depth unless otherwise ordered.

3.3 The completed surface shall approximate the lines and grades shown or ordered. When ordered, stone placed over 1 ft. outside or above such lines and grades shall be removed.

3.4 Stone fill (Bridge) shall be placed within the limits shown on the plans.

Method of Measurement

4.1 Stone fill will be measured by the cubic yard and in accordance with 109.01.

Basis of Payment

5.1 The accepted quantity of stone fill of the class specified will be paid for at the Contract unit price per cubic yard complete in place.

5.2 Gravel blanket material specified or ordered will be paid for under Section 209.

5.3 Geotextile specified or ordered will be paid for under Section 593.

Go To => [TOC](#) [Division 100](#) [Division 200](#) [Division 300](#) [Division 400](#)
[Division 500](#) [Division 600](#) [Division 700](#)

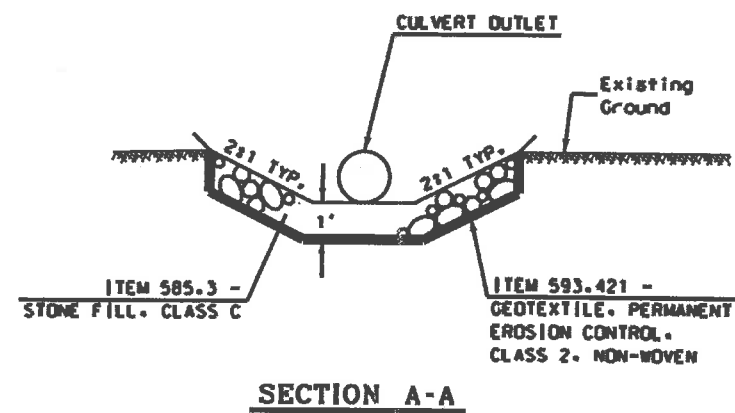
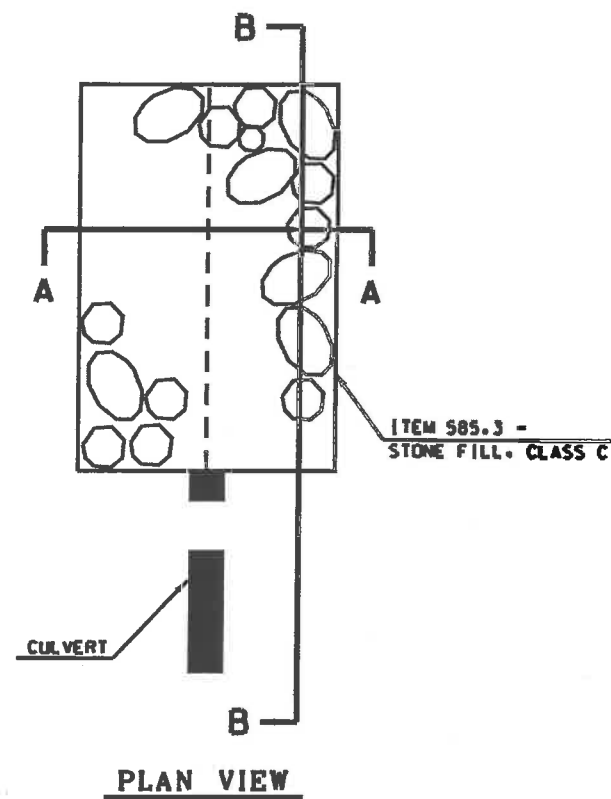
SECTION 585

5.4 The accepted quantity of excavation required for placing stone fill and for placing any underlying gravel blanket will be paid for under the item of excavation being performed. Excavation herein refers only to excavation of original ground or to material ordered removed not shown on the plans.

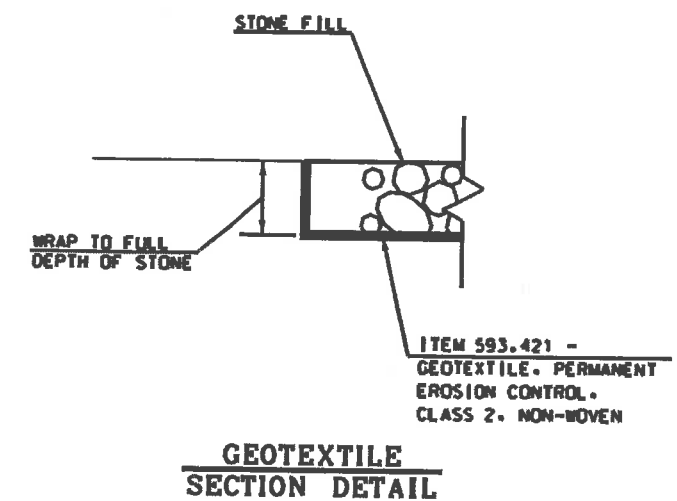
5.5 Free borrow will not be required to replace the accepted quantity of stone obtained from the excavation. However, when the plans do not call for borrow, but the quantity of material removed from excavation for use under this item requires the Contractor to furnish borrow to complete the work, such borrow will be subsidiary.

Pay items and units:

585.1	Stone Fill, Class A	Cubic Yard
585.2	Stone Fill, Class B	Cubic Yard
585.21	Stone Fill, Class B (Bridge)	Cubic Yard
585.3	Stone Fill, Class C	Cubic Yard
585.4	Stone Fill, Class D	Cubic Yard

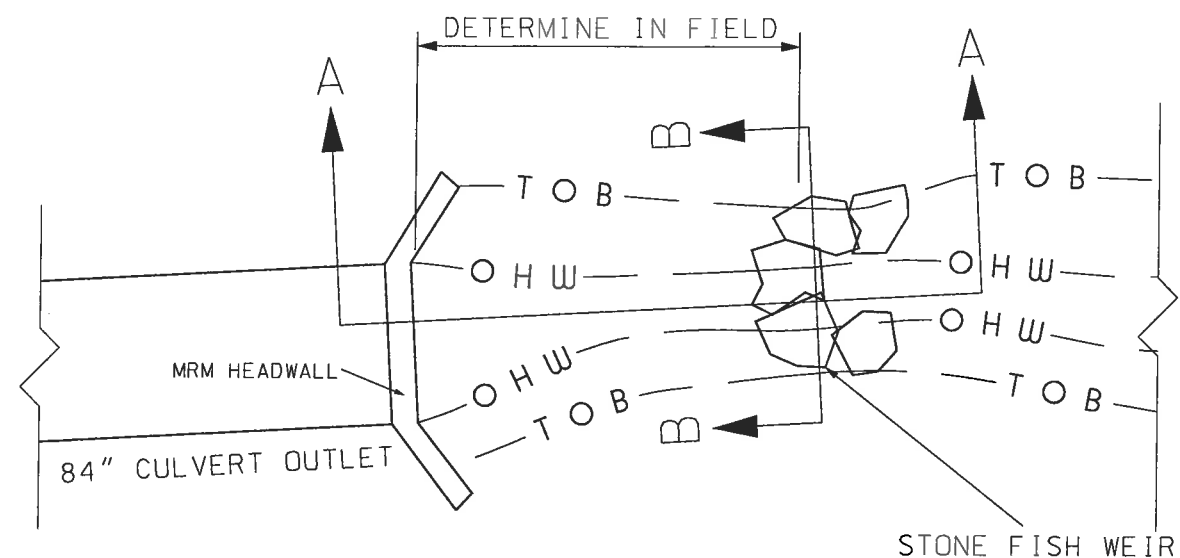


**OUTLET
PROTECTION DETAIL**
NOT TO SCALE

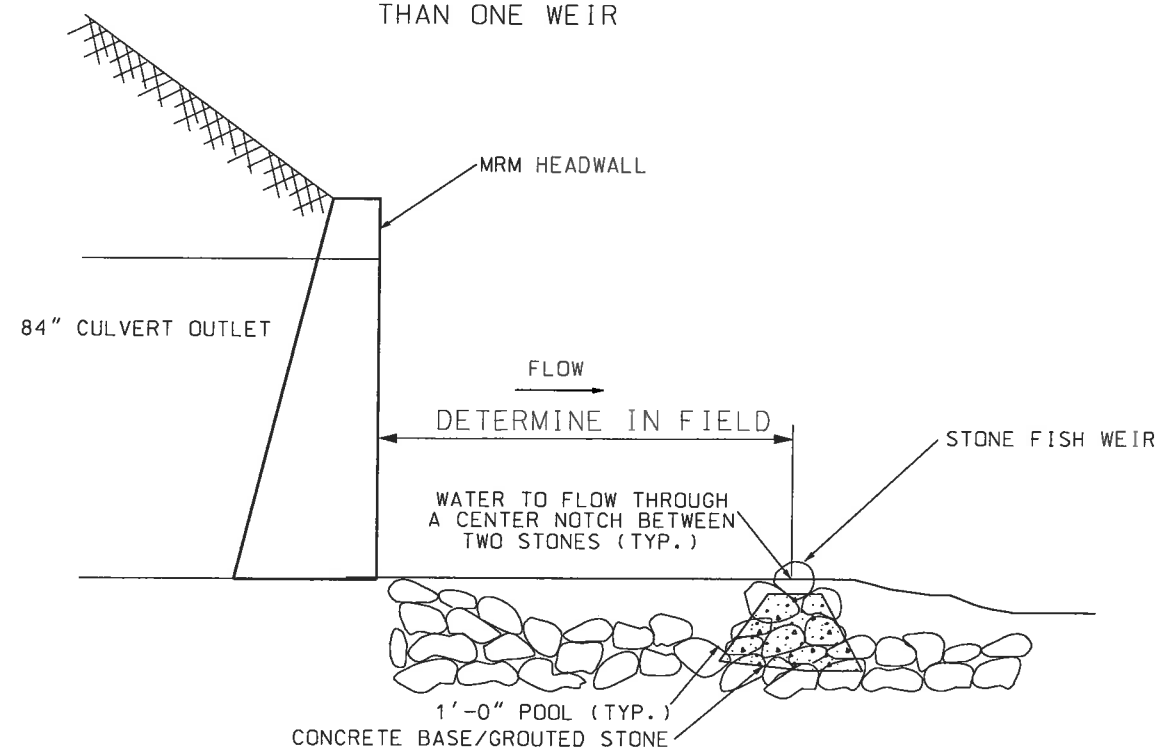


PRELIMINARY PLANS
SUBJECT TO CHANGE
DATE 11/27/2018

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
TYPICAL OUTLET PROTECTION DETAIL			
DCN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
40512outlet_pro	40512	1	1

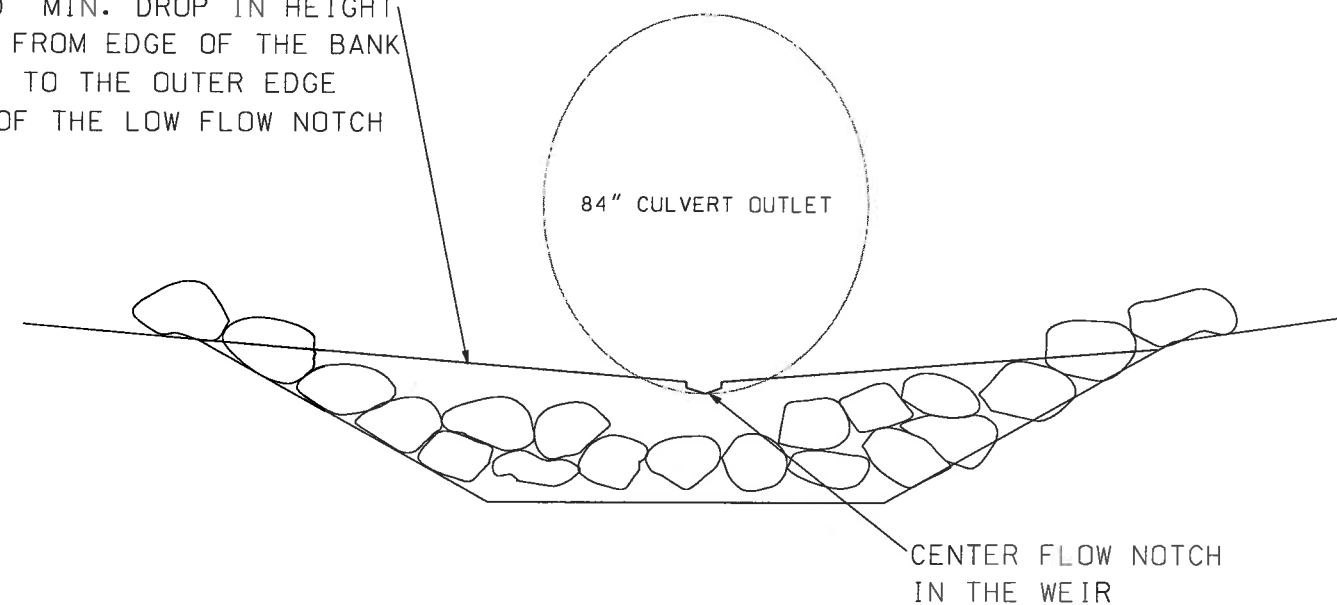


PLAN VIEW
NOT TO SCALE
CULVERTS MAY NEED MORE
THAN ONE WEIR



WEIR CROSS SECTION A-A
NOT TO SCALE

1'-0" MIN. DROP IN HEIGHT
FROM EDGE OF THE BANK
TO THE OUTER EDGE
OF THE LOW FLOW NOTCH



WEIR CROSS SECTION B-B
NOT TO SCALE

- NOTES:
1. DESIGN SHOWN IS FOR REFERENCE ONLY AND APPROXIMATE. MODIFICATIONS MAY BE REQUIRED IN THE FIELD, INCLUDING MATERIALS USED TO CONSTRUCT THE FISH WEIR.
 2. CONTRACTOR IS TO CONTACT FISH AND GAME FOR GUIDANCE DURING CONSTRUCTION

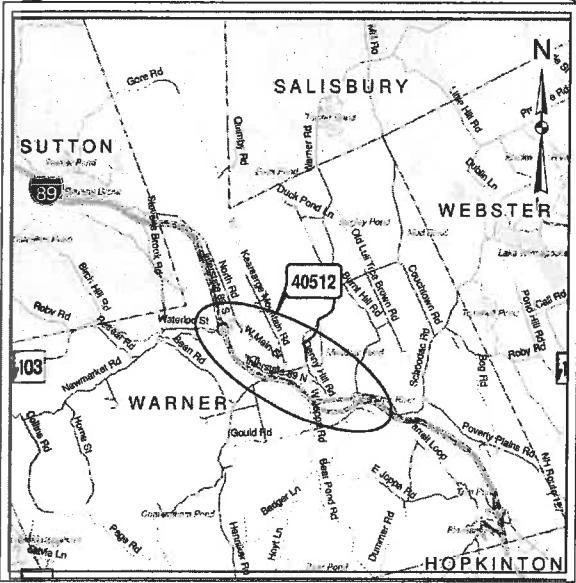
* THIS DETAIL IS FOR WETLAND
PLAN/APPLICATION PURPOSE ONLY.

STATE OF NEW HAMPSHIRE			
WARNER			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
FISH WEIR DETAIL			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
40512 Fish Weir	40512	1	1

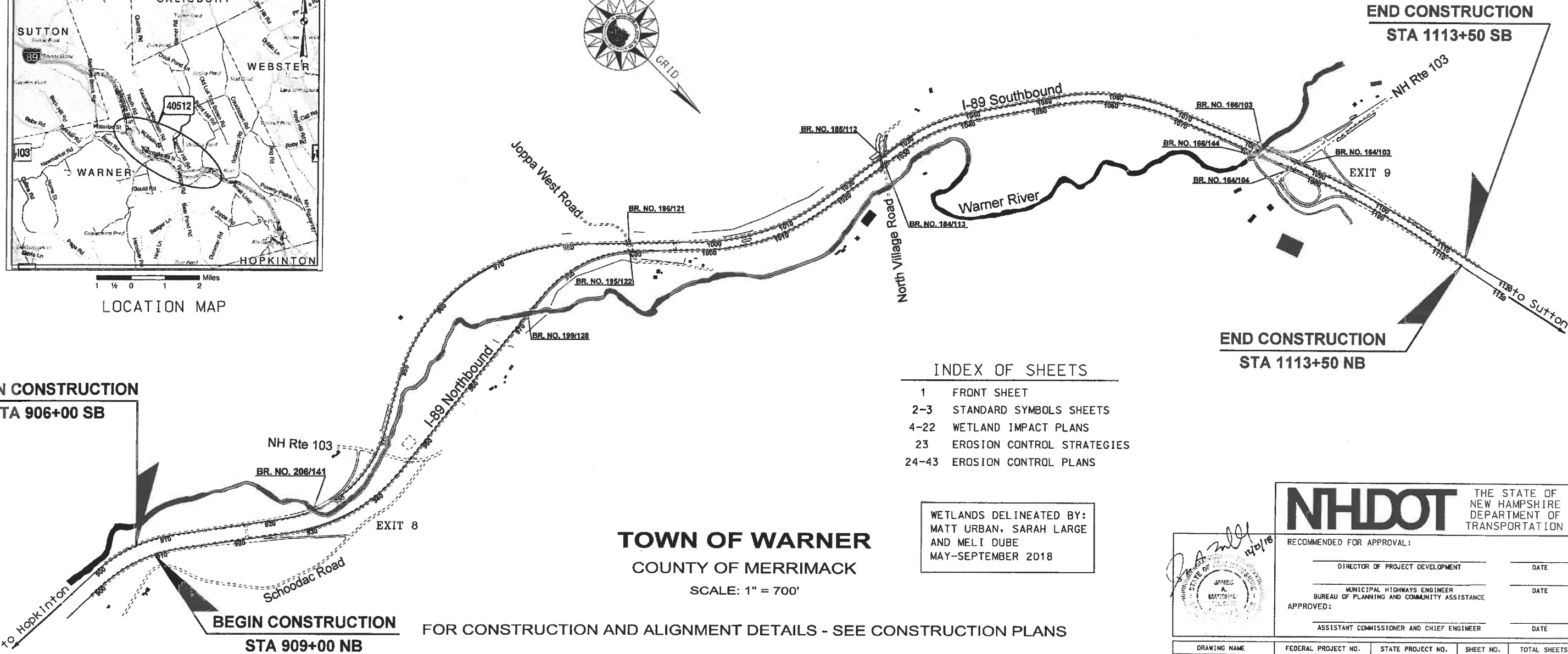
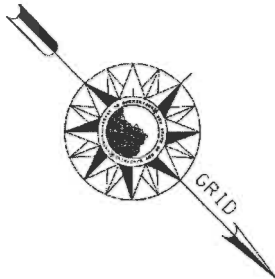
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
WETLANDS PLANS
FEDERAL AID PROJECT

X-A004(422)
NH PROJECT NO. 40512
INTERSTATE ROUTE 89

DESIGN DATA	
AVERAGE DAILY TRAFFIC 20_16	21,500
AVERAGE DAILY TRAFFIC 20_39	28,600
PERCENT OF TRUCKS	9.9%
DESIGN SPEED	70
LENGTH OF PROJECT	4.0



LOCATION MAP



BEGIN CONSTRUCTION
STA 906+00 SB

BEGIN CONSTRUCTION
STA 909+00 NB

END CONSTRUCTION
STA 1113+50 NB

END CONSTRUCTION
STA 1113+50 SB

INDEX OF SHEETS	
1	FRONT SHEET
2-3	STANDARD SYMBOLS SHEETS
4-22	WETLAND IMPACT PLANS
23	EROSION CONTROL STRATEGIES
24-43	EROSION CONTROL PLANS

TOWN OF WARNER
COUNTY OF MERRIMACK

SCALE: 1" = 700'

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

WETLANDS DELINEATED BY:
MATT URBAN, SARAH LARGE
AND MELI DUBE
MAY-SEPTEMBER 2018

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION				
RECOMMENDED FOR APPROVAL:				
DIRECTOR OF PROJECT DEVELOPMENT	DATE			
MUNICIPAL HIGHWAYS ENGINEER	DATE			
BUREAU OF PLANNING AND COMMUNITY ASSISTANCE	DATE			
APPROVED:	DATE			
ASSISTANT COMMISSIONER AND CHIEF ENGINEER	DATE			
DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
40512fsw	X-A004(422)	40512	1	43

GENERAL

SHORELAND - WETLAND

SDR PROCESSED			REVISIONS AFTER PROPOSAL					AS BUILT DETAILS	
NAME1	NAME2	NAME3	DATE	DATE	DATE	STATION	STATION	DATE	DATE
NEW DESIGN			DATE	DATE	DATE				
SHEET CHECKED			DATE	DATE	DATE				

EDGE OF PAVEMENT
TRAVELED WAY

PROPOSED ROADWAY
existing roadway
(pavement removed outside slope lines)

DRIVEWAYS
(label surface type)

BUILDINGS
(label house or type of building)
(building to be removed)

FOUNDATION
(label type)

LEACH FIELD
leach field

BRIDGE CROSSINGS
STREAM
OVERPASS

STEPS AND WALK
(label type)

INTERMITTENT WATER COURSE

SHORE LINE
river/stream
pond (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)
(deciduous) (coniferous) (stump)
(show station, circumference in feet & type)

TREE OR STUMP (CROSS-SECTIONS)

HEDGE
(label type)

MONITORING WELL
mon

WELL
W

FLAG POLE
fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

FENCE (LABEL TYPE)

SIGNS
(single post)
(double post)

GAS PUMP
gp

FUEL TANK (ABOVE GROUND)
ft (label size & type)

STORAGE TANK FILLER CAP
fc

SEPTIC TANK
S

GRAVE
gr

MAILBOX
mb

VENT PIPE
vp

SATELLITE DISH ANTENNA
da

PHONE
ph

GROUND LIGHT/LAMP POST
gl lp

BORING LOCATION
B

TEST PIT
TP

INTERSTATE NUMBERED HIGHWAY
293

UNITED STATES NUMBERED HIGHWAY
3

STATE NUMBERED HIGHWAY
102

WETLAND DESIGNATION AND TYPE

DELINEATED WETLAND
ORDINARY HIGH WATER
TOP OF BANK
TOP OF BANK & ORDINARY HIGH WATER
NORMAL HIGH WATER
WIDTH AT BANK FULL
PRIME WETLAND
PRIME WETLAND 100' BUFFER
NON-JURISDICTIONAL DRAINAGE AREA
COWARDIN DISTINCTION LINE
TIDAL BUFFER ZONE
DEVELOPED TIDAL BUFFER ZONE
HIGHEST OBSERVABLE TIDE LINE
MEAN HIGH WATER
MEAN LOW WATER
VERNAL POOL
SPECIAL AQUATIC SITE
REFERENCE LINE
WATER FRONT BUFFER
NATURAL WOODLAND BUFFER
PROTECTED SHORELAND
INVASIVE SPECIES LABEL
INVASIVE SPECIES

PUB2E
DW
OHW
TOB
TOBOHW
NHW
WBF
PWET
PWET100
NJDA
CDL
TBZ
DTBZ
HOTL
MHW
MLW
VP
SAS
REF
WB50
NWB150
PS250
I.S.
INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY
100 YEAR FLOODPLAIN BOUNDARY
FLOODWAY

FP500
FP100
FW

ENGINEERING

CONSTRUCTION BASELINE
PC, PT, POT (ON CONST BASELINE)
PI (IN CONSTRUCTION BASELINES)
INTERSECTION OR EQUATION OF TWO LINES
ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)
PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)
CLEARING LINE
SLOPE LINE
SLOPE LINE (FILL)
SLOPE LINE (CUT)
PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT)
FINISHED GRADE ELEVATION (RIGHT)

30 31 32
72.5 79.14

SHEET 1 OF 2

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	40512wetsymb	40512	2	43

REVISIONS AFTER PROPOSAL									
NUMBER		DATE	STATION	STATION	DESCRIPTION				
SOR PROCESSED		NAME1	DATE1	DATE1	DATE1				
NEW DESIGN		NAME2	DATE2	DATE2	DATE2				
SHEET CHECKED		NAME3	DATE3	DATE3	DATE3				
AS BUILT DETAILS									

WETLAND NUMBER	WETLAND PLANS SHEET NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
				PERMANENT				TEMPORARY		PERMANENT		
				N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	CHANNEL	BANK RIGHT
				SF	LF	SF	LF	SF	LF	LF	LF	LF
2	20	BANK	A	8	5	*	*			5	*	*
2	20	BANK	B	632	25	*	*	691	25	25	*	*
3	12	BANK	C	*	*	*	*	214	38	*	*	*
3	16	BANK	D	450	30	*	*	1470	40	*	*	30
3	17	BANK	F	*	*	*	*	108	22	*	*	*
9	6	BANK	G	*	*	*	*	23	10	*	*	*
9	6	BANK	H	*	*	*	*	213	16	*	*	*
10	6	R2UB2	I	*	*	*	*	240	14	*	*	*
10	6	R2UB2	J	*	*	*	*	140	21	*	*	*
11	6	PEM1E	K	*	*	*	*	70	*	*	*	*
11	6	PEM1E	L	*	*	*	*	130	*	*	*	*
11	6	PEM1E	M	*	*	118	*	211	*	*	*	*
20	10	PFO1A	N	*	*	*	*	70	*	*	*	*
23	9	BANK	O	7	3	*	*	28	6	*	*	*
24	9	R2UB1,2	P	*	*	16	3	23	5	*	*	*
25	9	BANK	Q	16	6	*	*	33	5	*	*	*
26	9	PEM1E	R	*	*	351	*	*	*	*	*	*
26	9	PEM1E	S	*	*	546	*	*	*	*	*	*
28	9	BANK	T	48	6	*	*	93	5	*	*	*
29	9	R2UB3	U	*	*	101	11	41	5	*	*	*
30	9	BANK	V	94	8	*	*	108	5	*	*	*
31	9	PEM1E	W	*	*	444	*	*	*	*	*	*
32	9	PEM1E	X	*	*	22	*	*	*	*	*	*
33	10	BANK	Y	98	18	*	*	148	25	*	*	*
34	10	R2UB1,2	Z	*	*	139	18	30	5	*	*	*
35	10	BANK	AA	126	20	*	*	65	5	*	*	*
36	10	BANK	AB	41	6	*	*	81	10	6	*	*
37	10	R2UB1,2	AC	*	*	74	10	42	5	*	10	*
38	10	BANK	AD	28	6	*	*	69	8	*	*	6
40	10	PSS1E/PEM1E	AF	*	*	244	*	164	*	*	*	*
41	11	R2UB1,2	AG	*	*	251	26	77	5	27	26	27
42	11	PFO1E	AH	*	*	94	*	155	*	*	*	*
43	11	R2UB1,2	AI	*	*	228	20	83	5	20	20	20
44	11	PFO1E/PSS1E	AJ	*	*	110	*	180	*	*	*	*
48	12	PSS1E	AK	*	*	265	*	285	*	*	*	*
48	13	PSS1E	AL	*	*	1525	*	808	*	*	*	*
49	12/13	PEM1E/PFO1E	AM	*	*	*	*	2736	*	*	*	*
51	13	BANK	AN	*	*	*	*	108	25	*	*	*
52	13	R2UB1,2	AO	*	*	*	*	298	20	*	*	*
53	13	BANK	AP	*	*	*	*	77	21	*	*	*
54	13	BANK	AQ	535	60	*	*	22	5	*	*	*
55	13	R2UB1,2	AR	*	*	484	60	51	5	*	*	*
56	13	BANK	AS	560	63	*	*	46	5	*	*	*
57	13	BANK	AT	*	*	*	*	73	24	*	*	*
58	13	BANK	AU	*	*	*	*	140	22	*	*	*
59	13	R2UB1,2	AV	*	*	*	*	140	23	*	*	*
60	13	R2UB1,2	AW	*	*	1474	82	*	*	*	*	*
61	13	R2UB1,2	AX	*	*	307	25	*	*	29	25	15
62	14	R4SB6	AY	*	*	130	15	79	5	*	15	*
63	15	R4UB1	AZ	*	*	67	17	26	6	*	17	*
64	15	R4UB1	BA	*	*	54	15	23	5	*	15	*
65	15	R4UB1,2	BB	*	*	31	8	24	7	*	8	*
66	15	R4UB1,2	BC	*	*	352	49	18	5	*	49	*
67	17	BANK	BD	33	15	*	*	24	5	*	*	15
68	17	R2UB1,2	BE	*	*	105	16	46	5	*	16	*
69	17	BANK	BF	103	18	*	*	23	5	18	*	*
70	17	BANK	BG	70	12	*	*	44	5	*	*	12
71	17	R2UB1,2	BH	*	*	90	11	63	6	*	11	*
72	17	BANK	BI	44	6	*	*	67	6	6	*	*
73	17	PEM1E	BJ	*	*	304	*	7961	*	*	*	*
74	17	BANK	BK	310	63	*	*	51	6	*	*	63
75	17	R2UB1,2	BL	*	*	1903	58	137	5	*	58	*
76	17	BANK	BM	434	53	*	*	68	6	53	*	*
77	17	BANK	BN	666	73	*	*	27	5	*	*	*
78	17	R2UB1,2	BO	*	*	1847	68	200	5	*	*	*
79	17	BANK	BP	838	54	*	*	449	37	*	*	*
82	18	PEM1E	BQ	*	*	171	*	*	*	*	*	*
84	18	R4UB1,2	BR	*	*	251	17	106	8	*	17	*
85	19	R4UB1	BS	*	*	67	17	35	7	*	*	*
88	21	BANK	BT	675	20	*	*	335	33	*	*	20
88	21	BANK	BU	1800	34	*	*	978	18	*	*	34
88	21	BANK	BV	1534	20	*	*	767	10	*	*	20
89	22	R4SB3,4	BW	*	*	101	15	9	5	*	15	*
91	15	BANK	BX	39	45	*	*	5	5	*	*	*
92	15	BANK	BY	52	54	*	*	7	5	*	*	*
93	18	BANK	BZ	34	16	*	*	162	18	*	*	*
94	18	BANK	CA	9	5	*	*	35	6	*	*	*
TOTALS:				9284	744	12266	561	21553	674	189	302	262

WETLANDS CLASSIFICATION CODES	
BANK	BANK - PERENNIAL STREAM
BANK	BANK - INTERMITTENT STREAM
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PEM1E/PFO1E	PALUSTRINE, EMERGENT, PERSISTENT / PALUSTRINE FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PSS1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PSS1Eh	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED, DIKED/IMPOUNDED
PSS1E/PEM1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS / PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PSS1C/PFO1C	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS / PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED
PFO1A	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, TEMPORARILY FLOODED
PFO1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PFO1E/PSS1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS / PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
R2UBH	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED
R2UB1,2	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SAND
R2UB2	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, SAND
R2UB3	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, MUD
R3UBH	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED
R4SB3,4	RIVERINE, INTERMITTENT, STREAMBED, COBBLE-GRAVEL, SAND
R4UB1	RIVERINE, INTERMITTENT, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL
R4UB1,2	RIVERINE, INTERMITTENT, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SAND
R4SB6	RIVERINE, INTERMITTENT, STREAMBED, ORGANIC

LEGEND

TYPE OF WETLAND IMPACT	SHADING/HATCHING	#	WETLAND DESIGNATION NUMBER
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)		#	WETLAND IMPACT LOCATION
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		#	WETLAND MITIGATION AREA
TEMPORARY IMPACTS			MITIGATION

TOTAL PROJECT IMPACTS:			
PERMANENET IMPACTS:	21,550	SF	
TEMPORARY IMPACTS:	21,553	SF	
TOTAL IMPACTS:	43,103	SF	

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	40512wetsymb	40512	4	43

The diagram illustrates the wetland impact plans for the I-89 Southbound and Northbound lanes. It shows the proposed construction area, including the clearing line and the wetland boundary. The plan includes stationing for the approach and construction areas, as well as a scale bar and a north arrow.

Key Features:

- Warner River:** Located at the top left of the plan.
- Schoodic Road:** Located at the bottom left of the plan.
- I-89 Southbound:** Lanes 908 to 912.
- I-89 Northbound:** Lanes 908 to 912.
- Clearing Line:** Indicated by a dashed line.
- Wetland Boundary:** Indicated by a solid line.
- Stationing:**
 - BEGIN APPROACH STA 905+50 SB**
 - BEGIN CONSTRUCTION STA 906+00 SB**
 - BEGIN APPROACH STA 908+50 NB**
 - BEGIN CONSTRUCTION STA 909+00 NB**
- Scale:** 50 0 50 100 SCALE IN FEET.
- North Arrow:** Indicated by a dashed line.
- Wetland Impact:** Indicated by a shaded area.
- Wetland Impact Plans:** Indicated by a dashed line.

Legend:

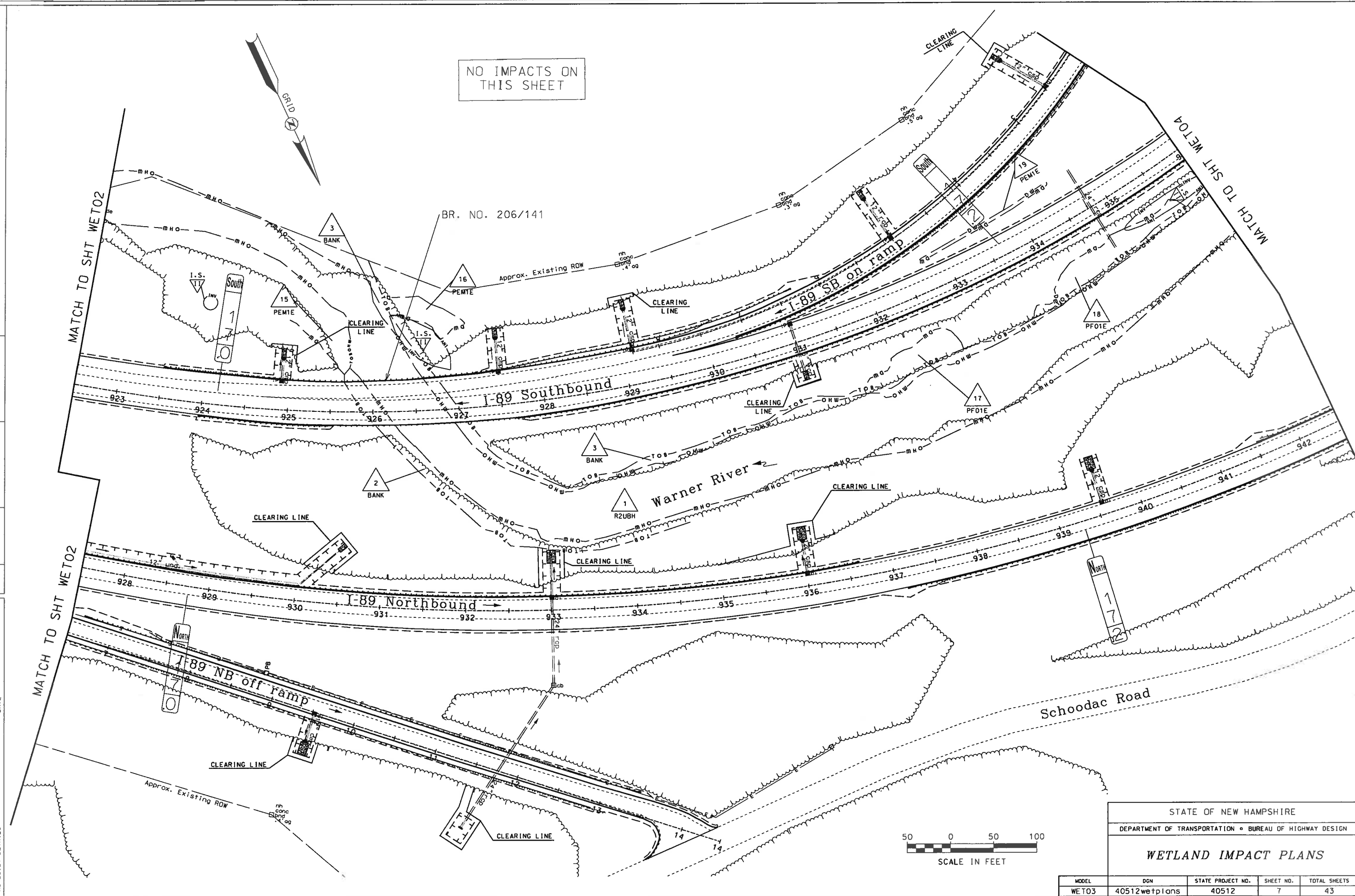
- Approx. Existing ROW
- Warner River
- Schoodic Road
- I-89 Southbound
- I-89 Northbound
- Clearing Line
- Wetland Boundary
- Stationing
- Scale
- North Arrow
- Wetland Impact
- Wetland Impact Plans

Notes:

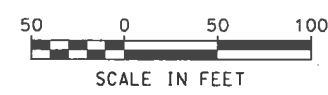
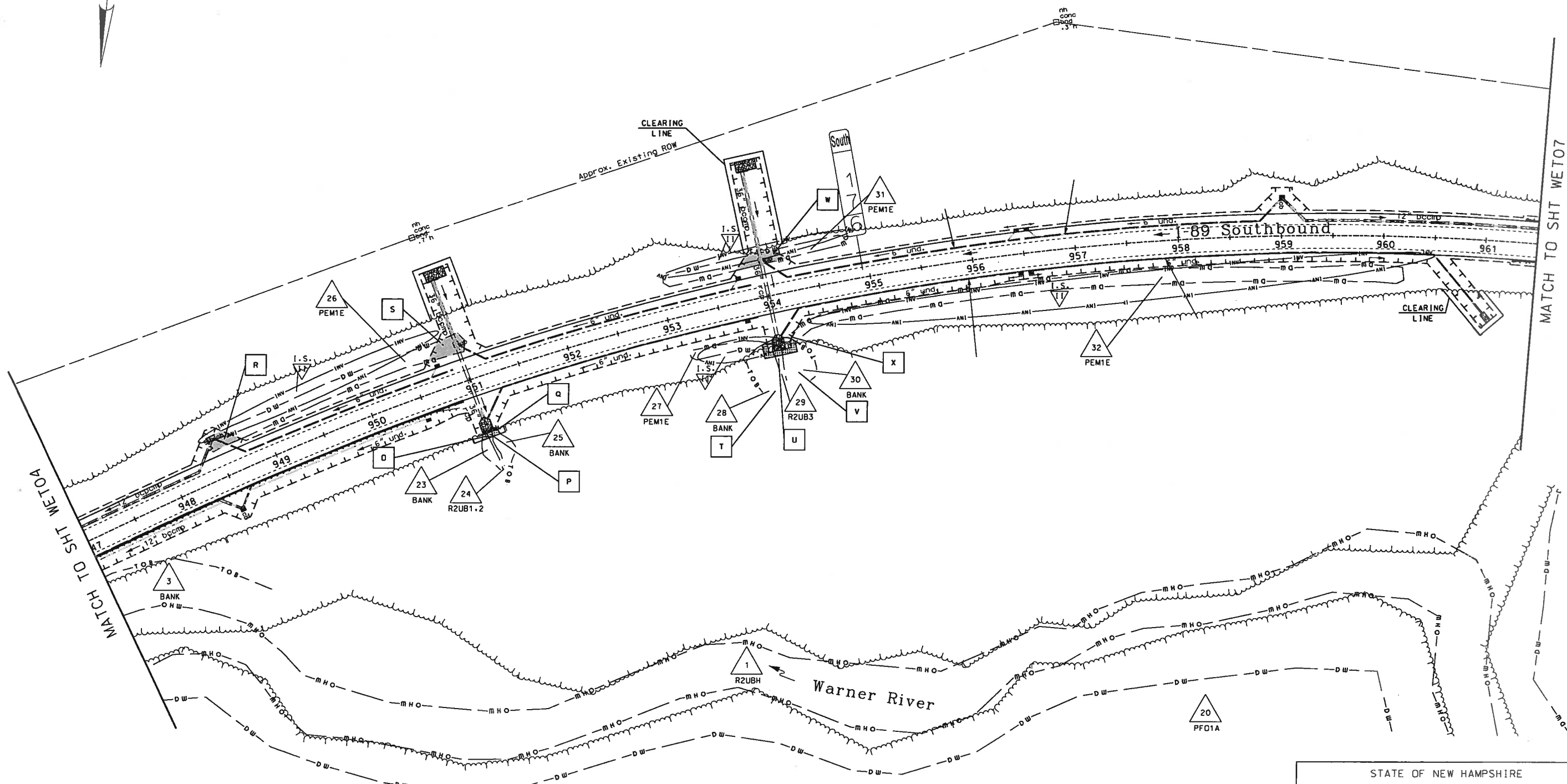
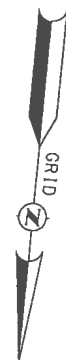
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- SELECTIVE CLEARING REMOVE 12 WHITE PINES (2 LARGE-10 SMALL)
- MATCH TO SHT WET02

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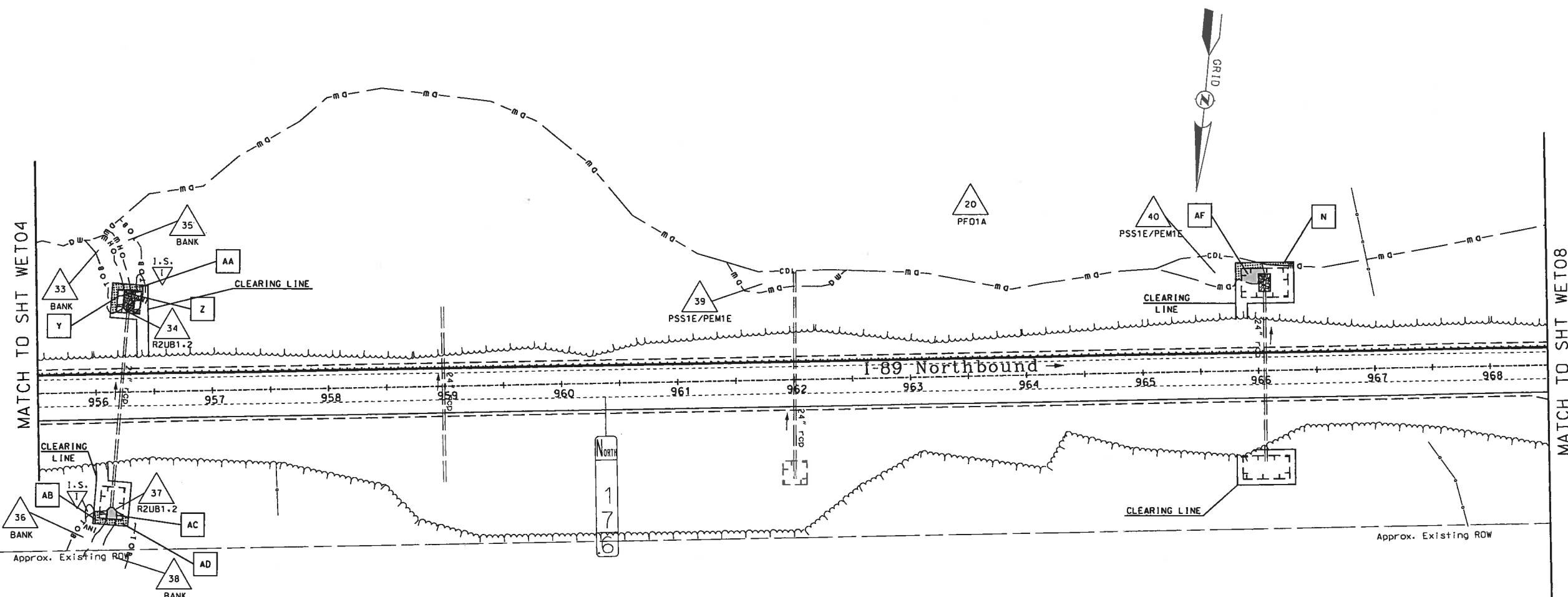
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DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
WET01	40512wetplans	40512	5	43

[illegible]

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AS BUILT DETAILS			DATE					

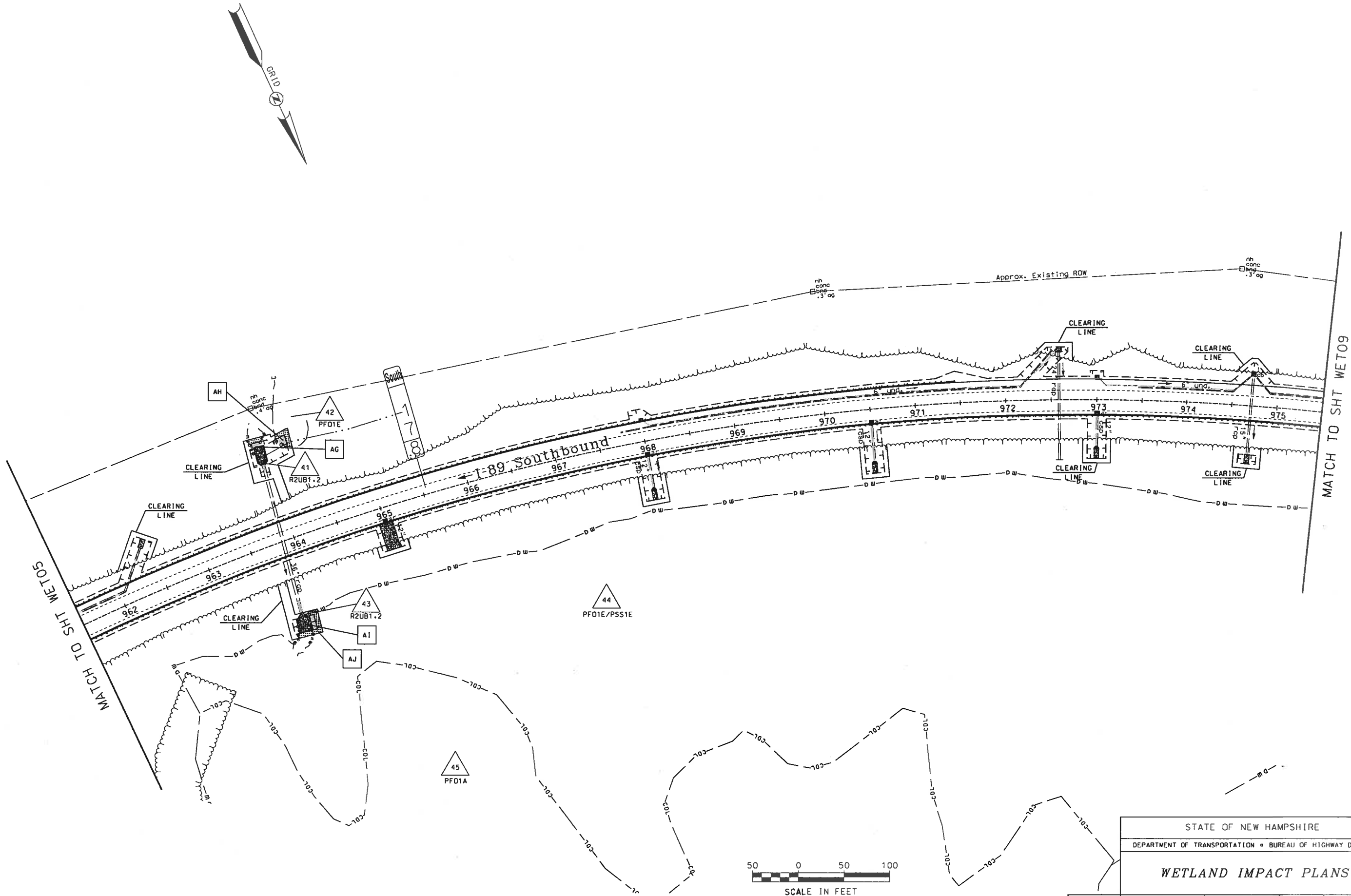


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DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
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WET05	40512wetplans	40512	9	43

[illegible]

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>WETLAND IMPACT PLANS</i>			
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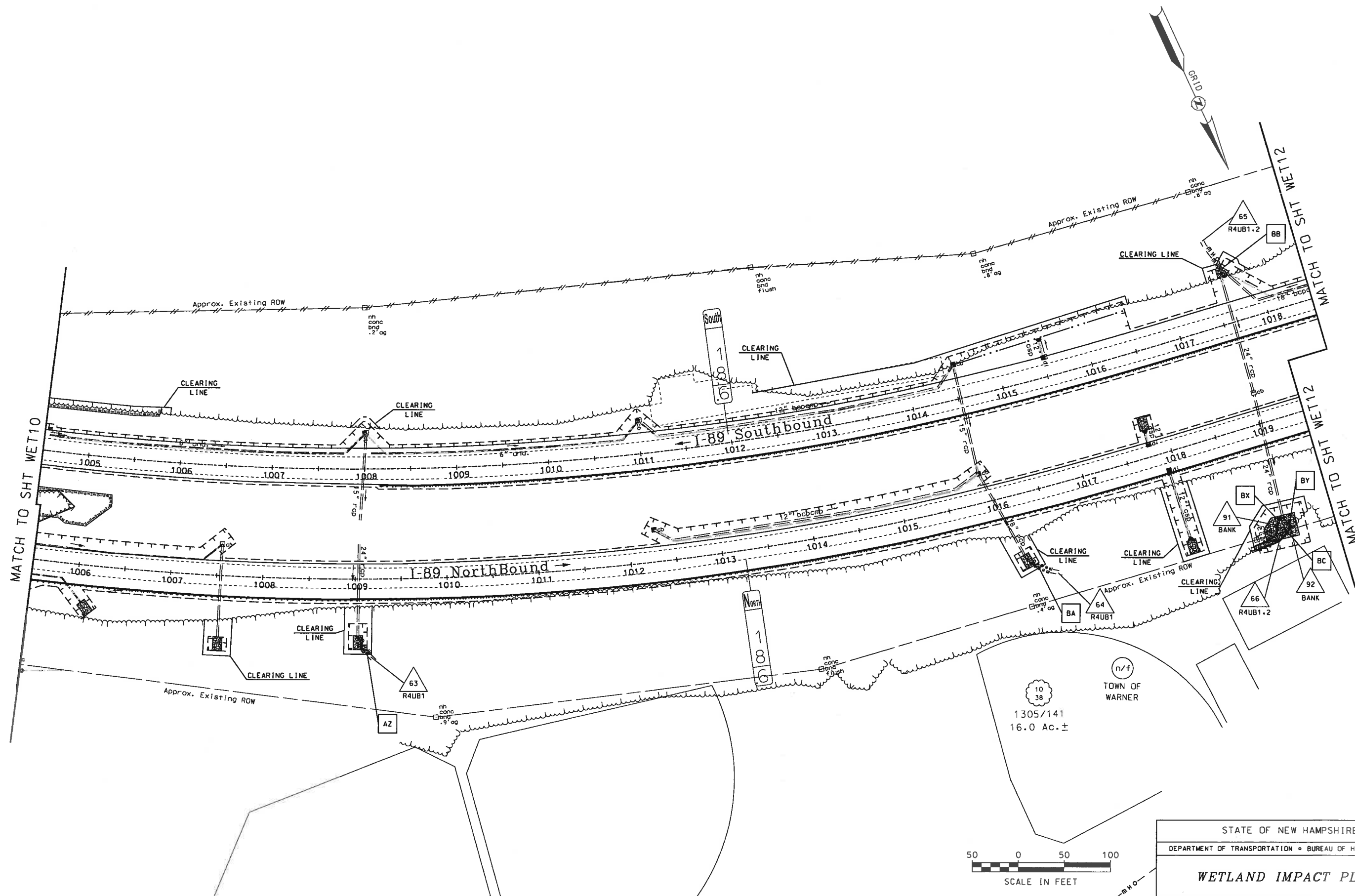
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AS BUILT DETAILS			DATE			



STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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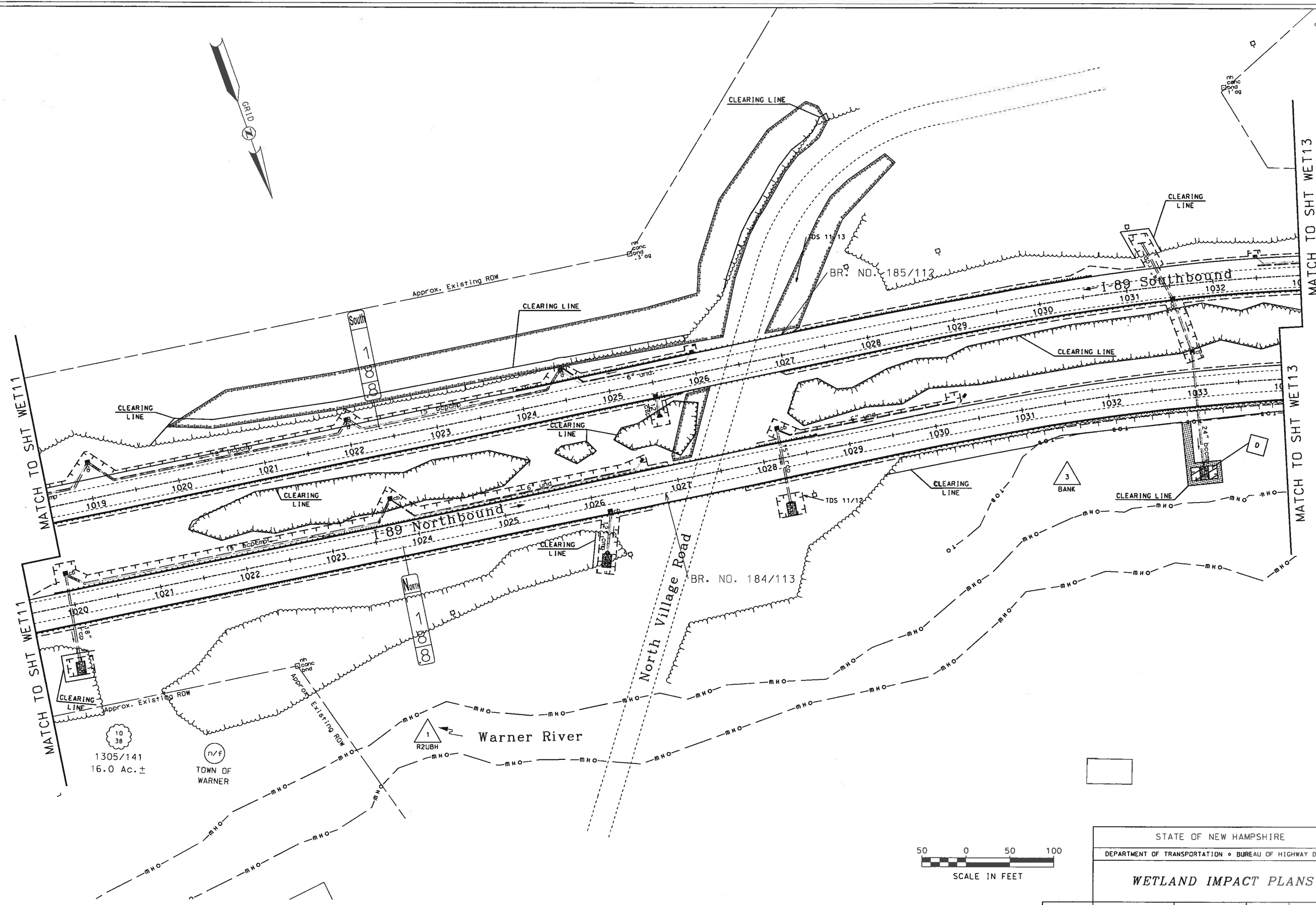
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100 RHO	STATE OF NEW HAMPSHIRE				
	DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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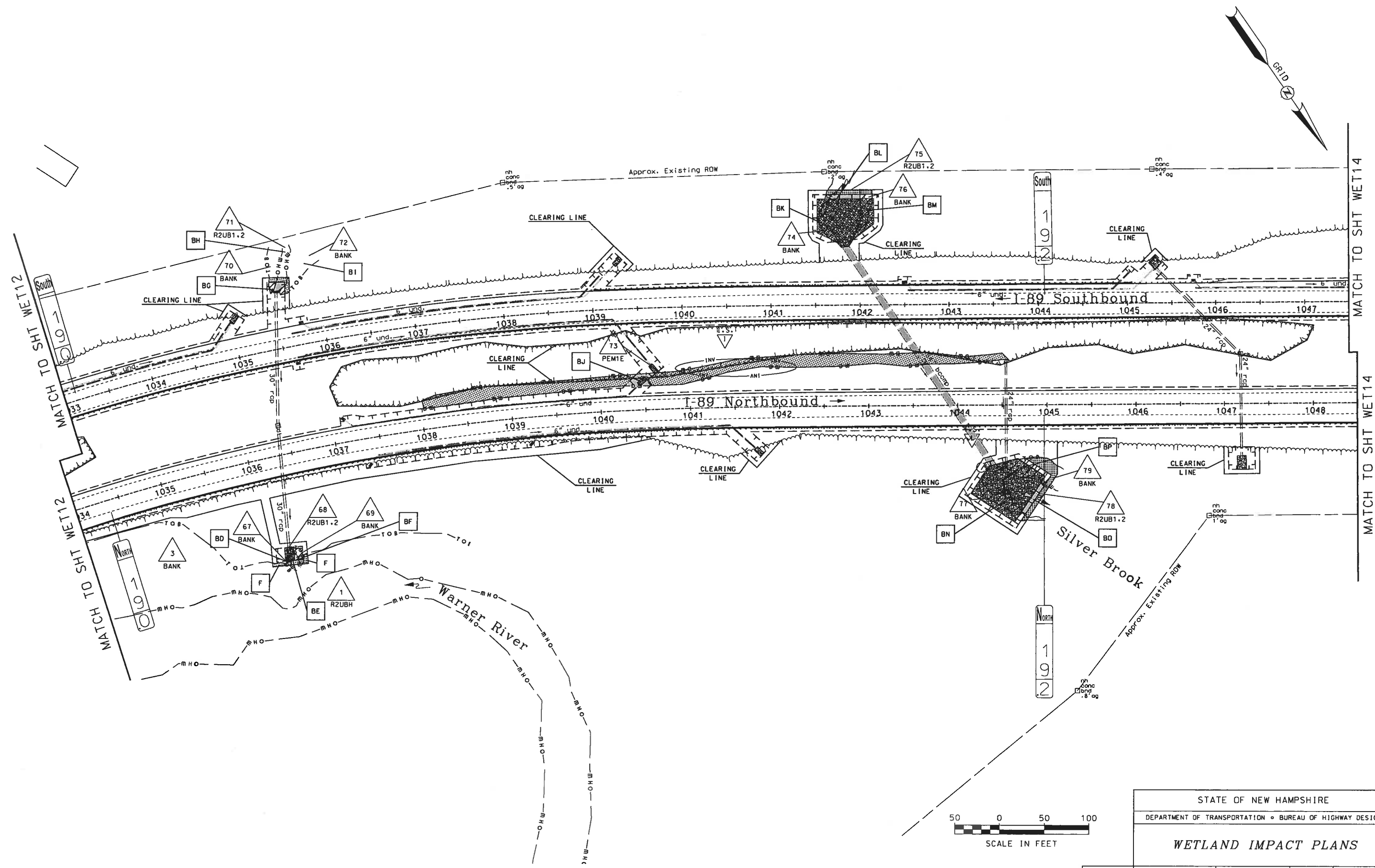
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STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
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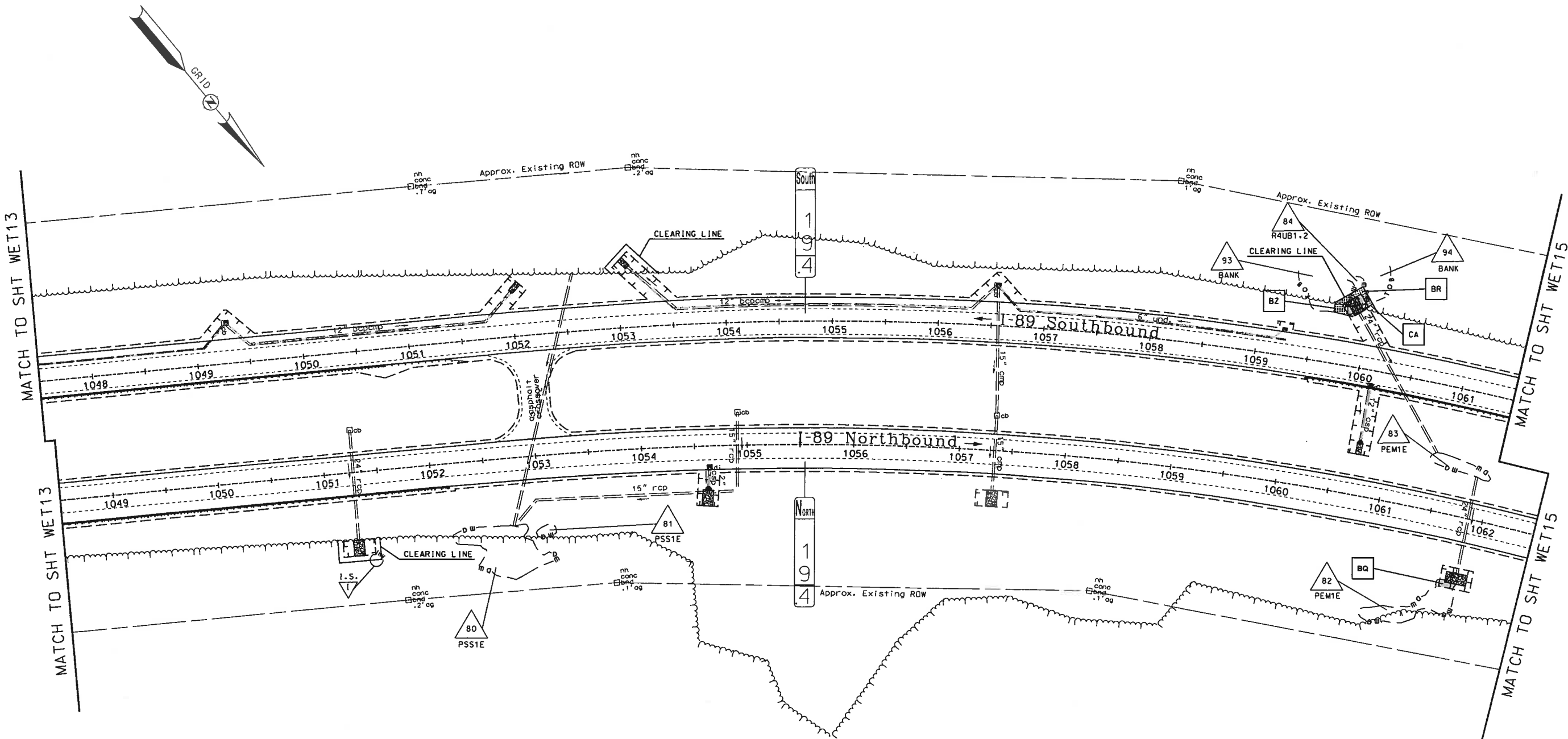
STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

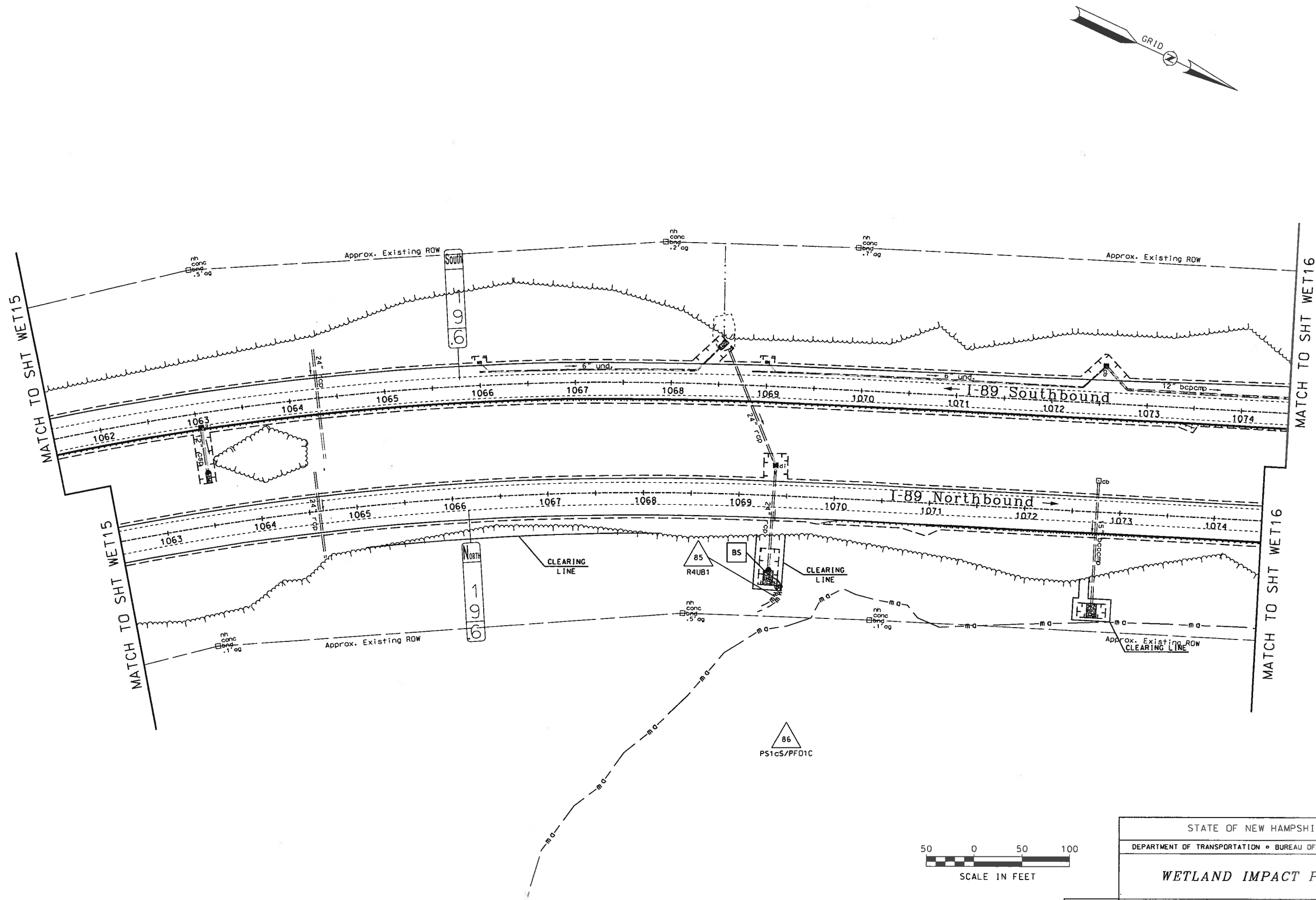
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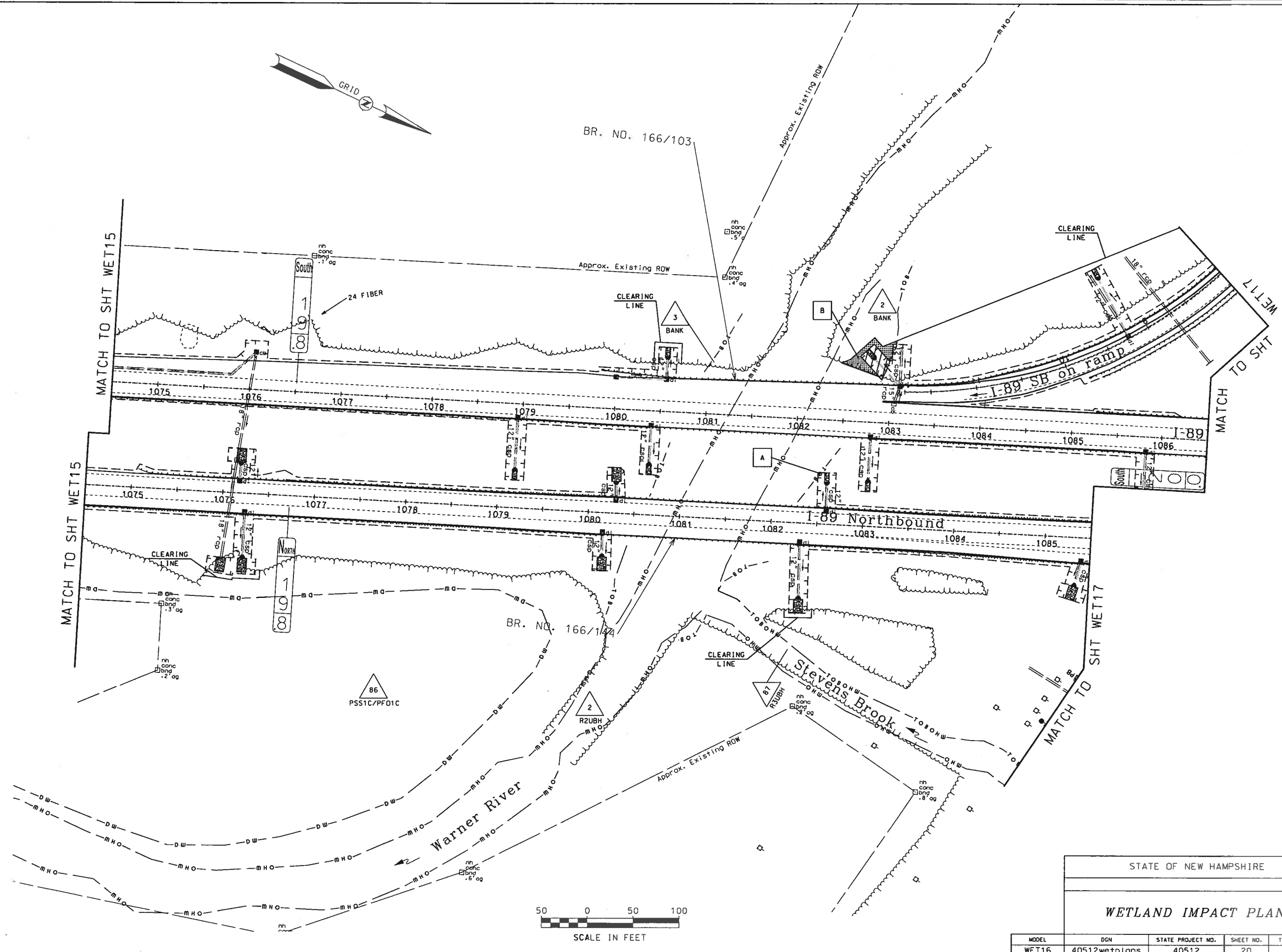
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		DATE					



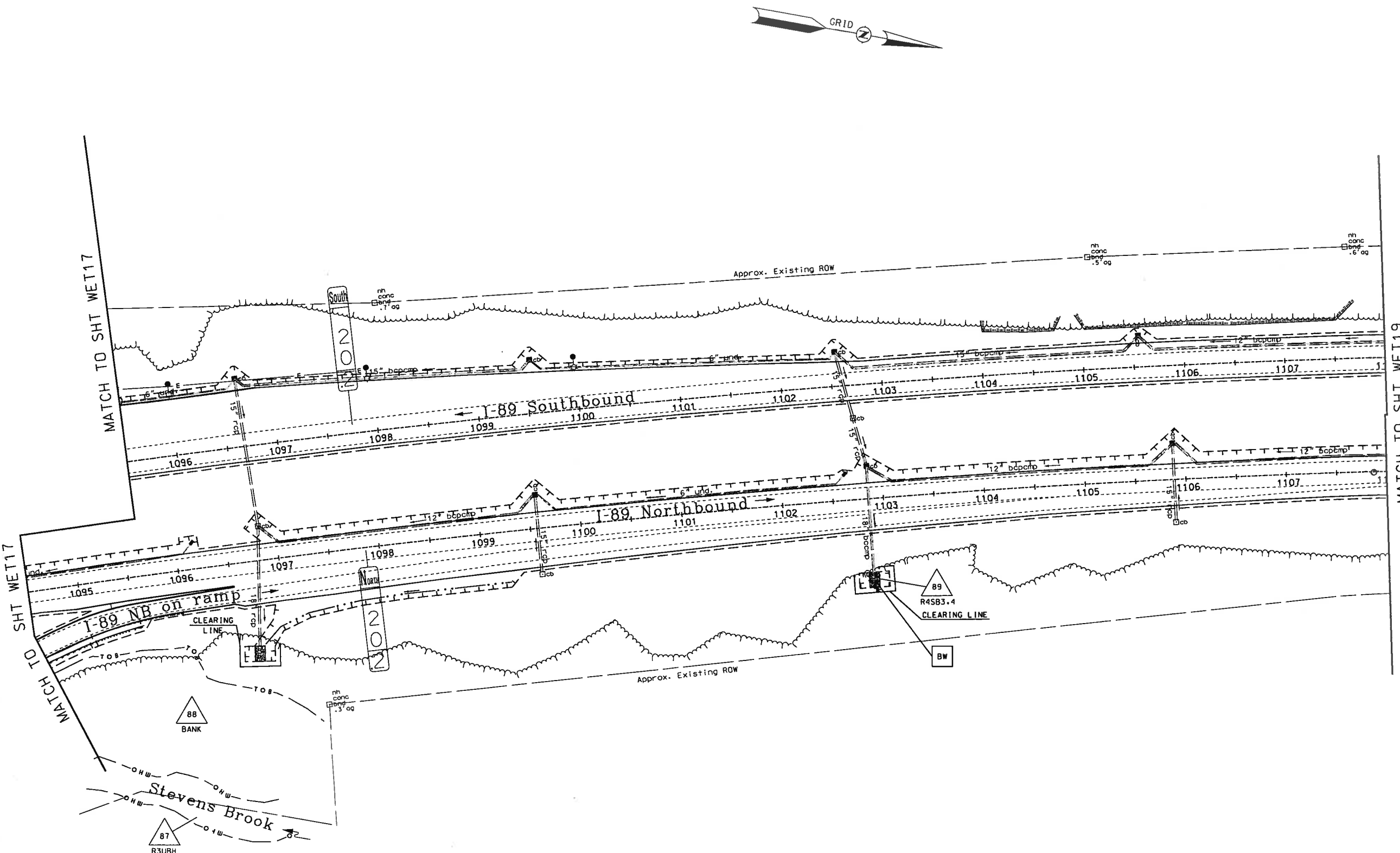
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DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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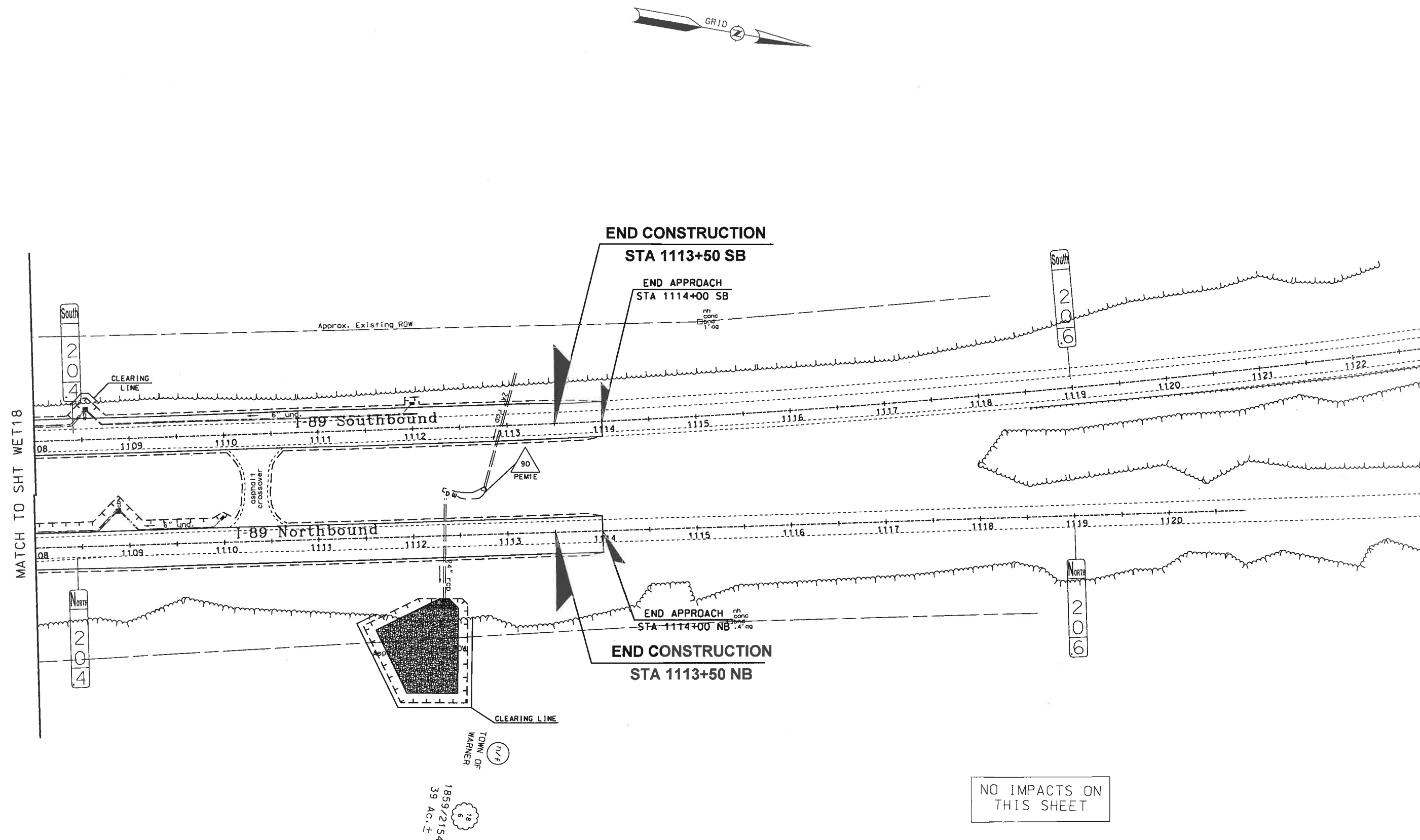
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AS BUILT DETAILS			REVISIONS AFTER PROPOSAL				
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STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>WETLAND IMPACT PLANS</i>			
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SHEET CHECKED	NAME3	DATE	DATE3				
AS BUILT DETAILS				DATE			



NO IMPACTS ON
THIS SHEET



STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>WETLAND IMPACT PLANS</i>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
40512wetplans	40512	23	43

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
- 1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
- 1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
- 1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
- 1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
- 1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WO 1500 REQUIREMENTS ([HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM](http://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM))
- 1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.
2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
- 2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
- 2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
- 2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
- 2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
- (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
- (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
- (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
- (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
- 2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
- 2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
- 2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
- 2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30th AND MAY 1st OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
- (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
- (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15th, OR WHICH ARE DISTURBED AFTER OCTOBER 15th, SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
- (C) AFTER NOVEMBER 30th INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
- (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WO 1505.02 AND ENV-WO 1505.05.
- (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WO 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30th.
- GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS
3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
- 3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
- 3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
- 3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
- 3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
- 3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.
4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
- 4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
- 4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
- 4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1st THROUGH NOVEMBER 30th, OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.
5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
- 5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
- 5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
- 5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
- 5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
- 5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.
6. PROTECT SLOPES:
- 6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
- 6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
- 6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
- 6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.
7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
- 7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
- 7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.
8. PROTECT STORM DRAIN INLETS:
- 8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
- 8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
- 8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
- 8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.
9. SOIL STABILIZATION:
- 9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
- 9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
- 9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15th OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
- 9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.
10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
- 10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WO 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
- 10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
- 10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
- 11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
- 11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
- 11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
- 11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
- 11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
- 11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
- 11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
- 11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
- 11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
- 12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
- 12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
- 12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
- 12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
- 12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
- 12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
- 12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.
13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
- 13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
- 13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
- 13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRICES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
- 13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.
14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
- 14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
- 14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
- 14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WO 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

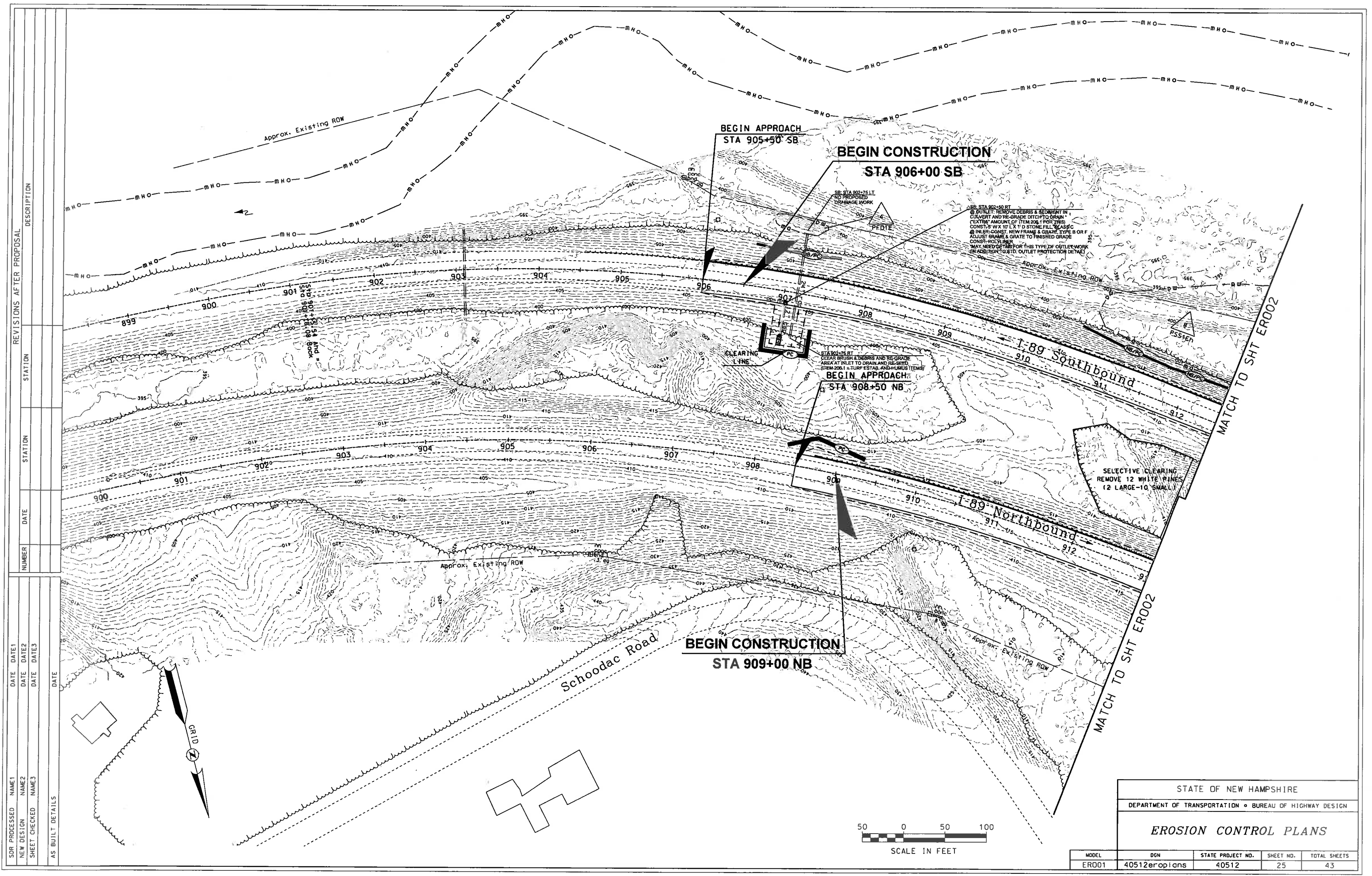
TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES ¹	YES ¹	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCOONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

- NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤ 10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

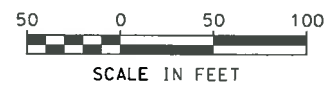
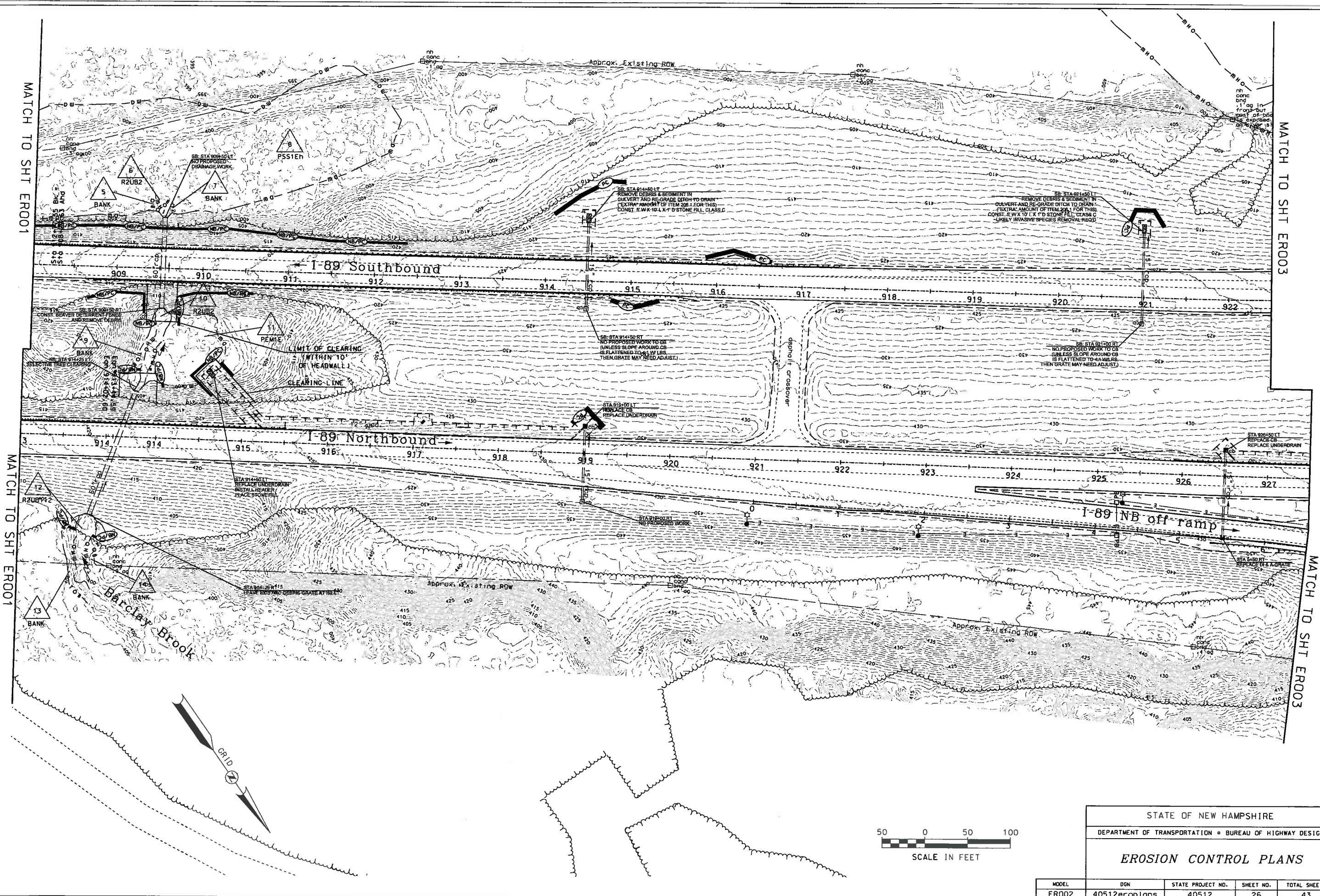
STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
WETLAND IMPACT PLANS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	erosstrat	40512	24	43



REVISIONS AFTER PROPOSAL		STATION		DATE		DESCRIPTION	
NUMBER	DATE	NUMBER	DATE	NUMBER	DATE	NUMBER	DATE
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SHEET CHECKED	NAME3	DATE	DATE3	AS BUILT DETAILS	DATE		

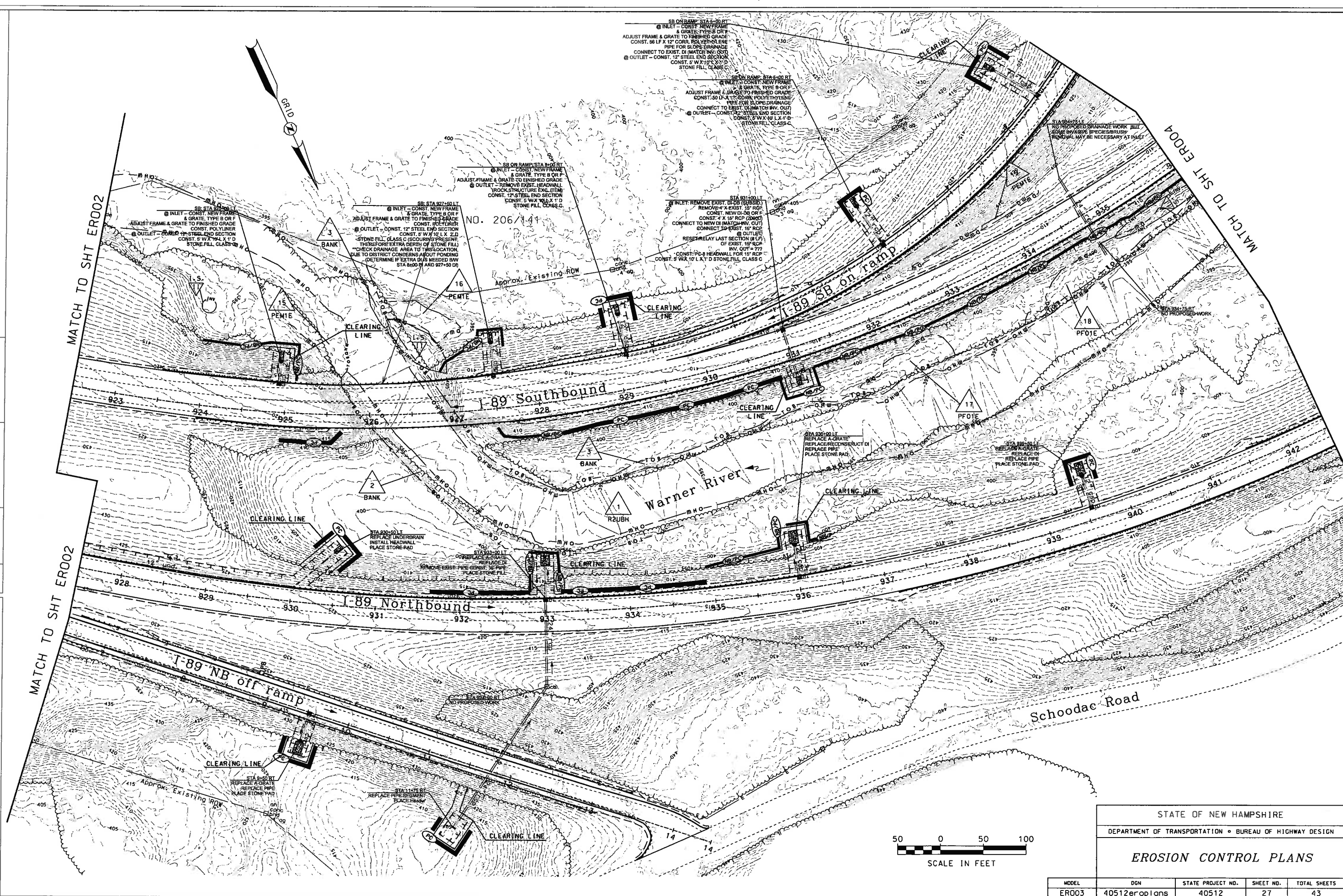
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ER001	40512eroplans	40512	25	43

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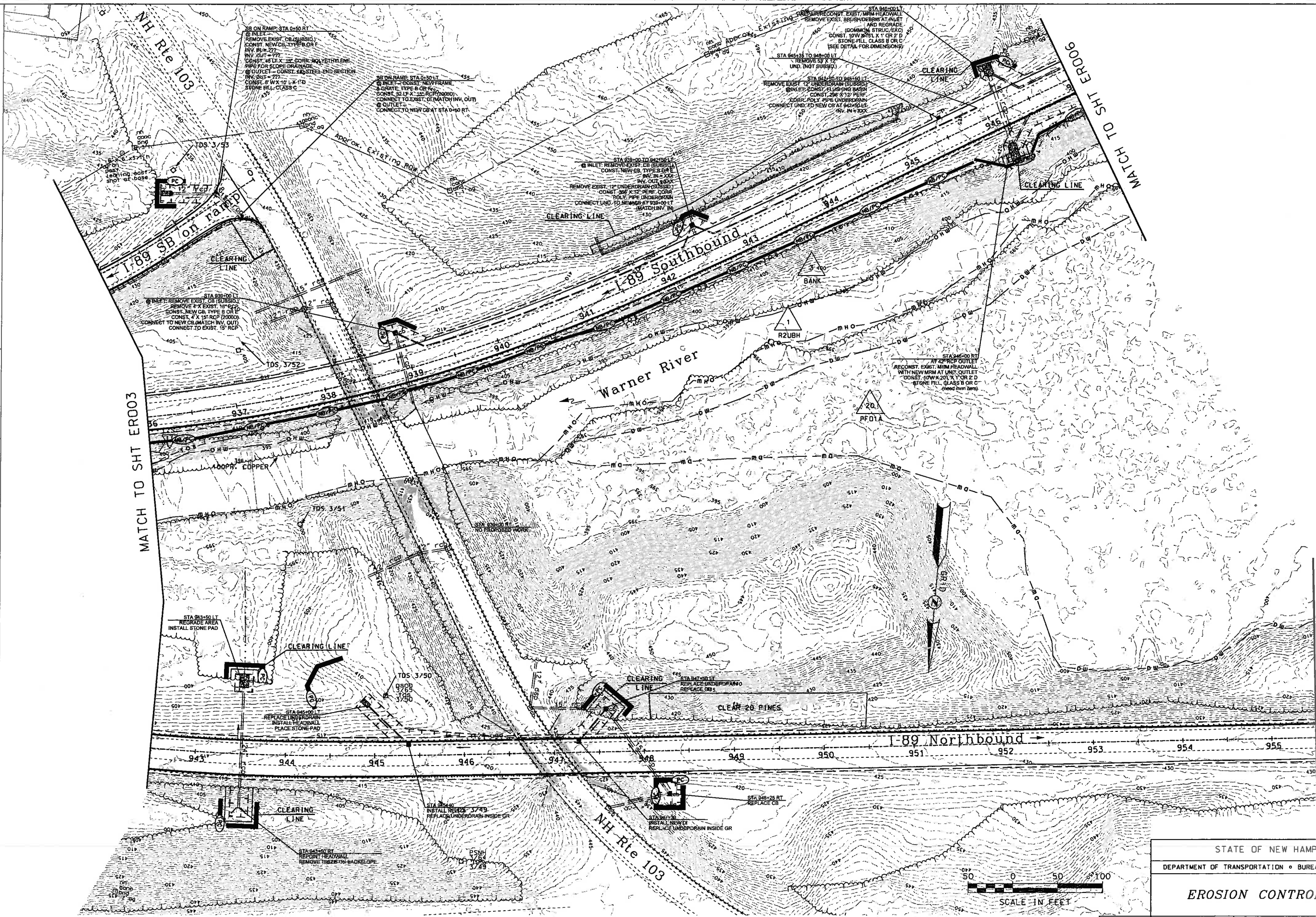
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ER002	40512eroplans	40512	26	43

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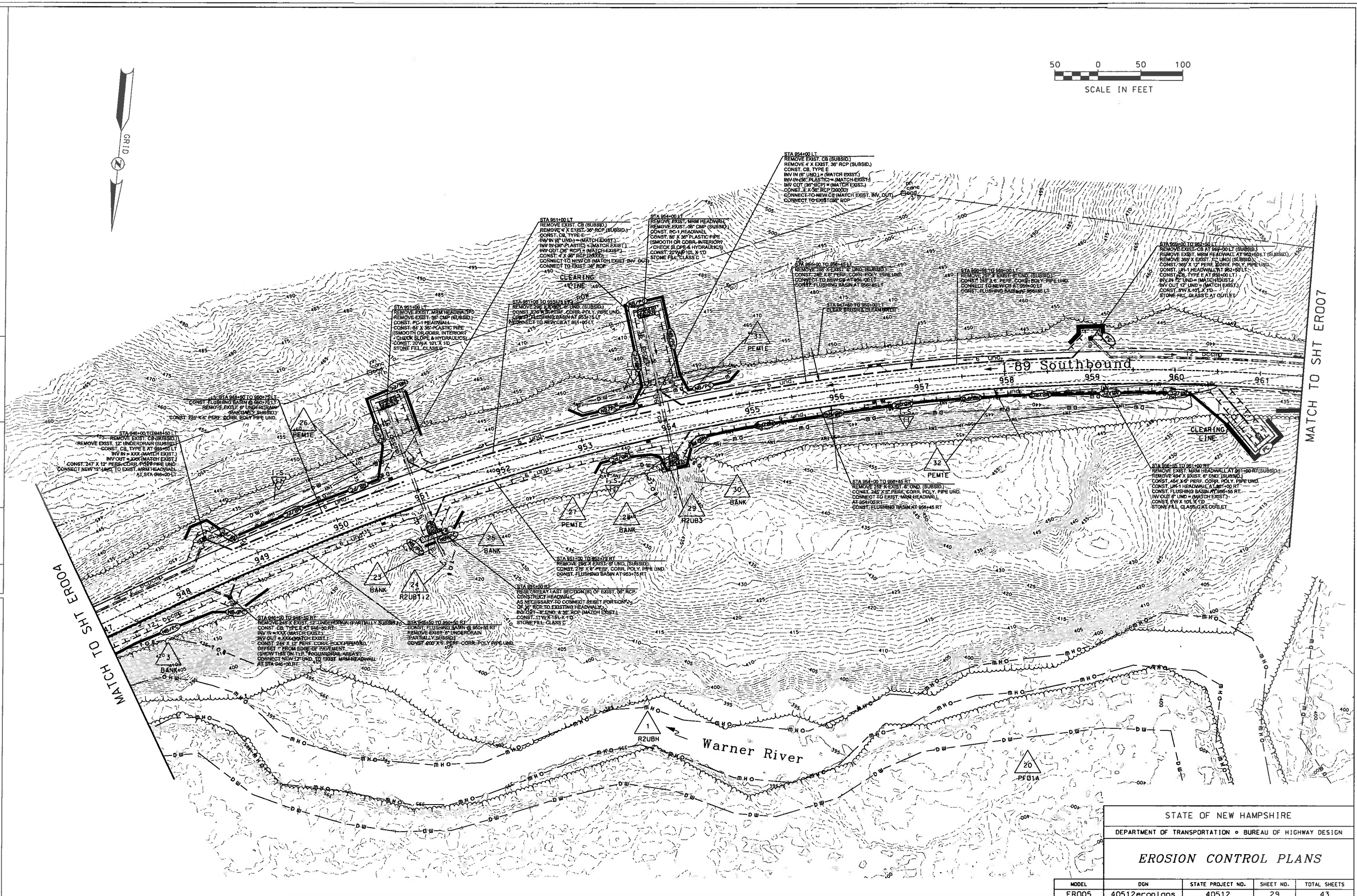
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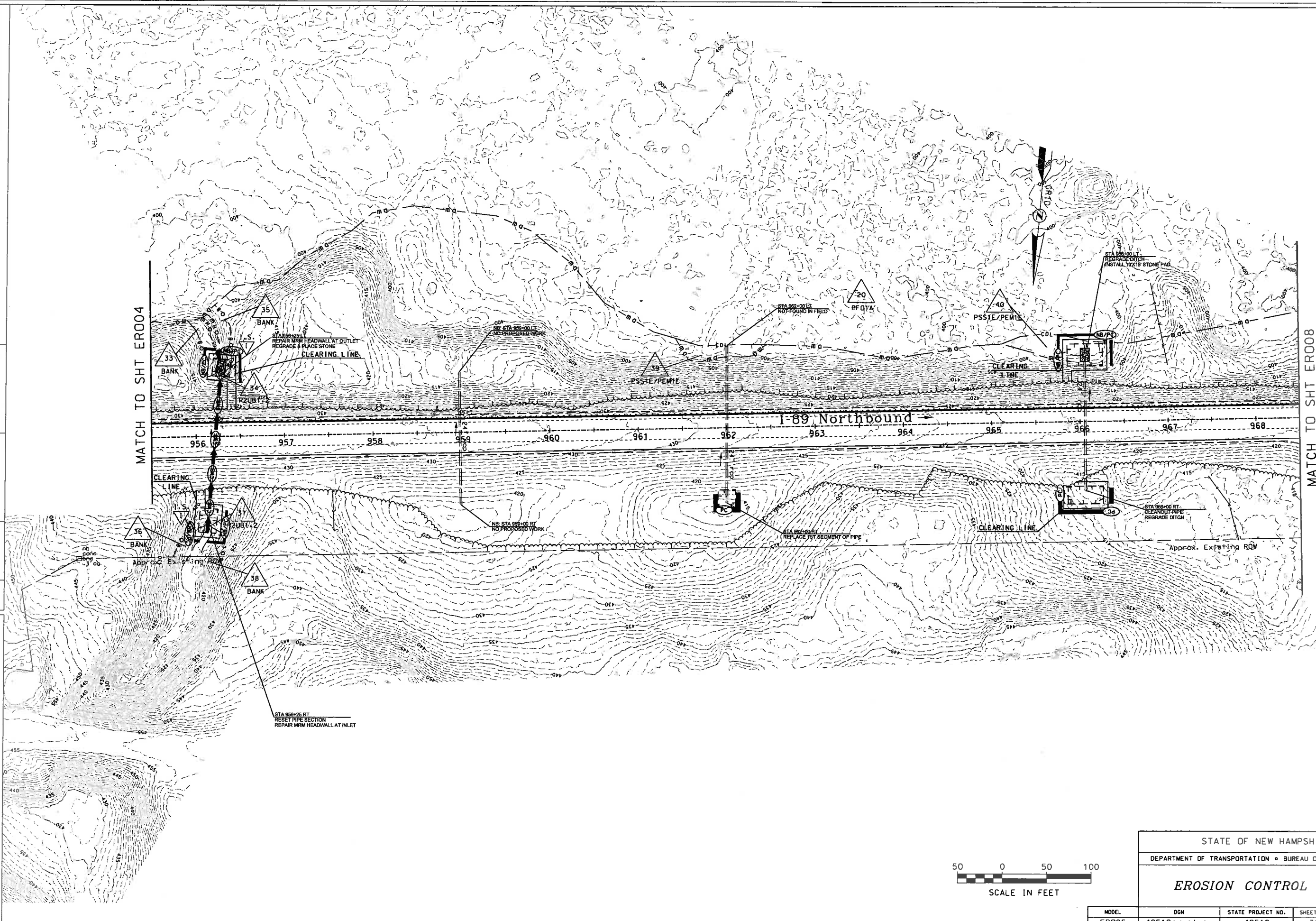
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STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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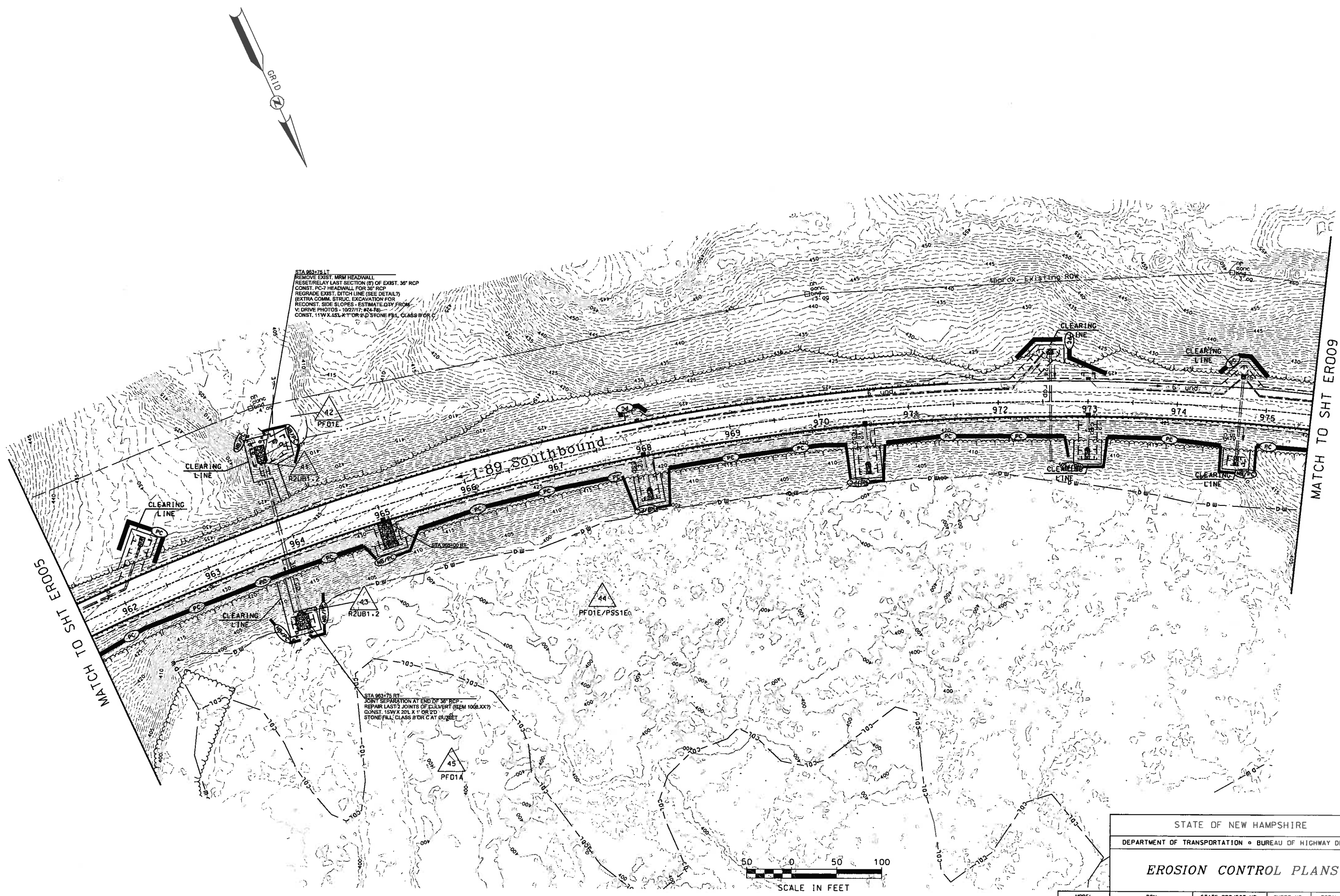
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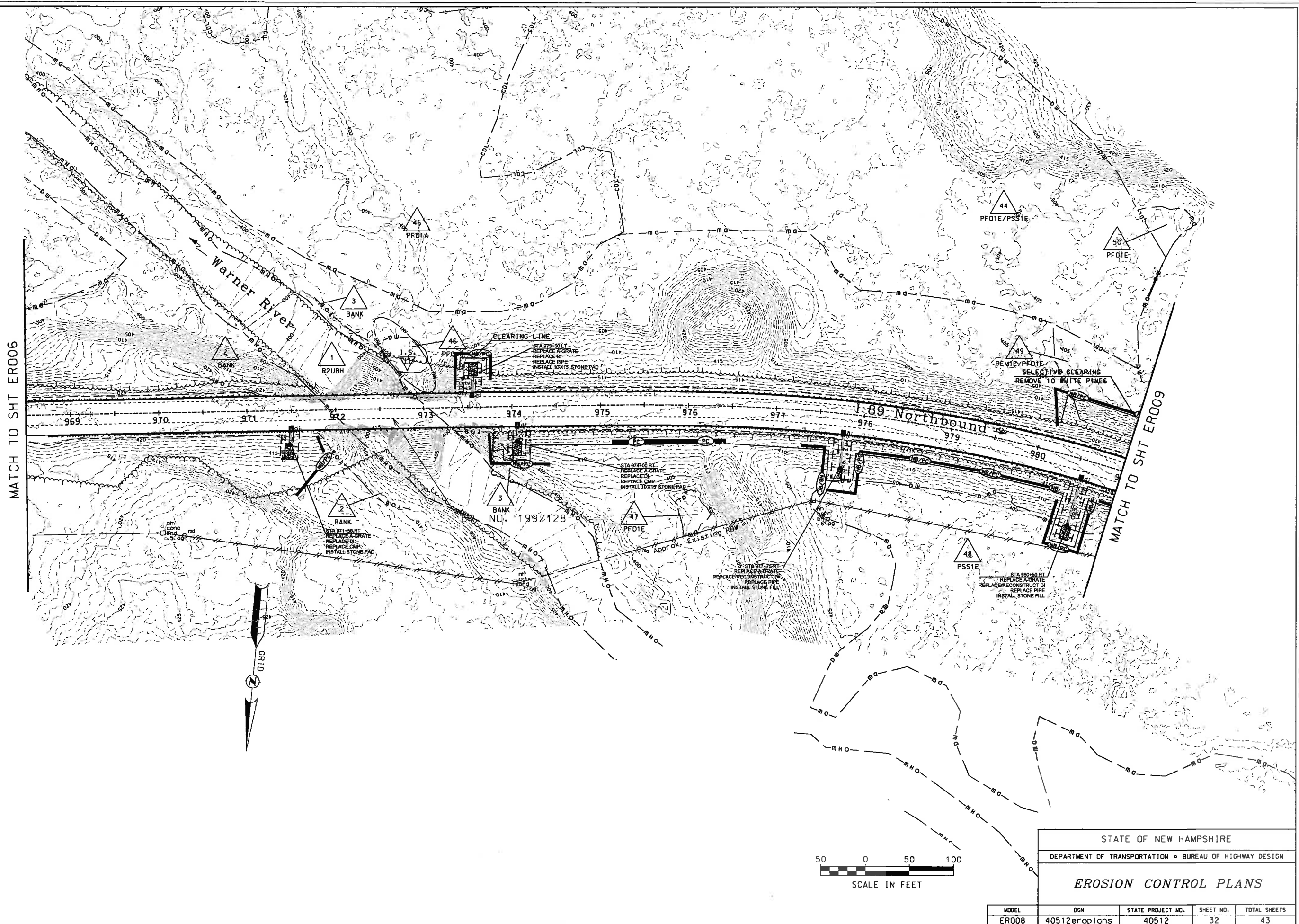
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DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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ER006	40512eroplans	40512	30	43

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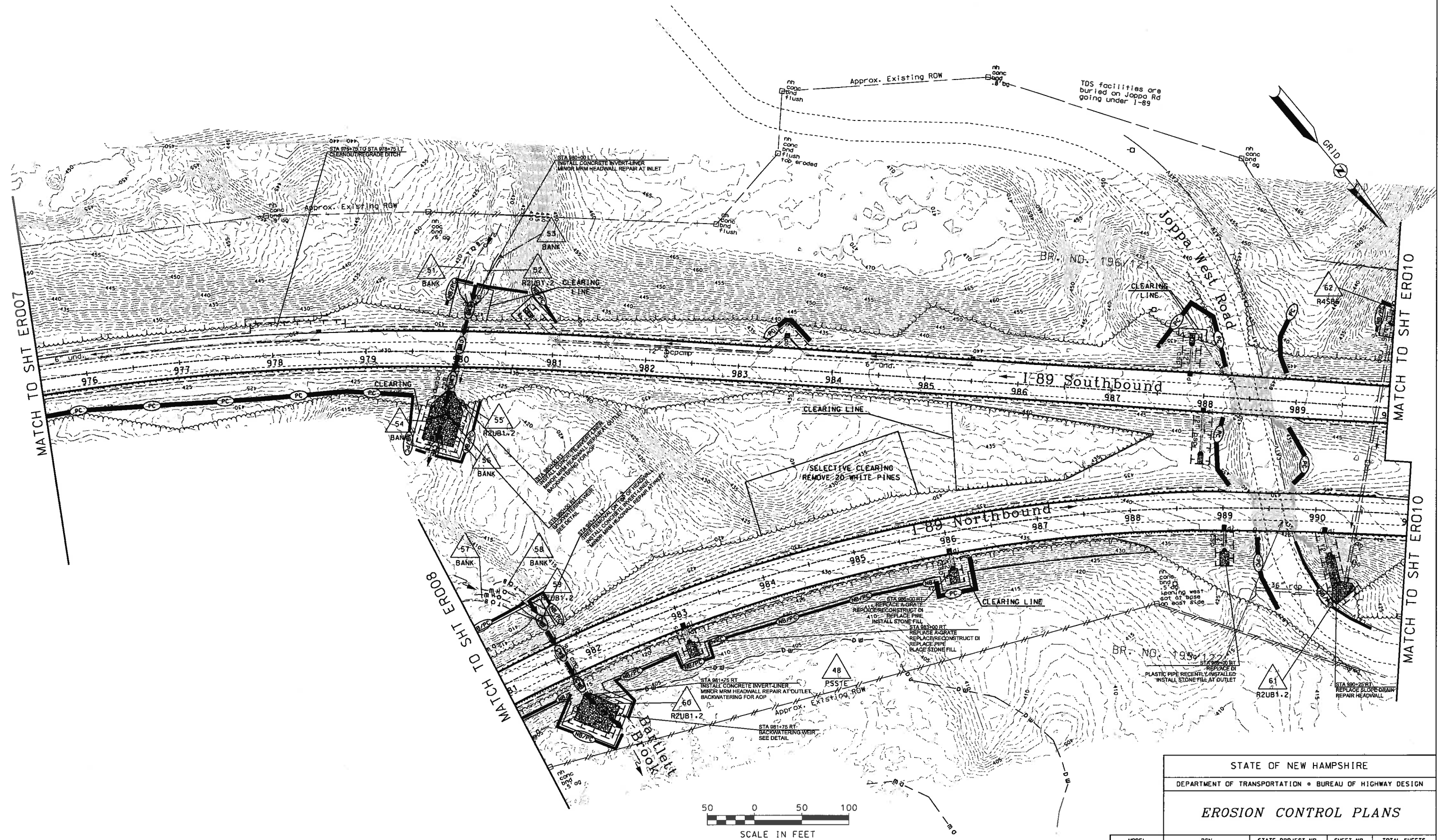


STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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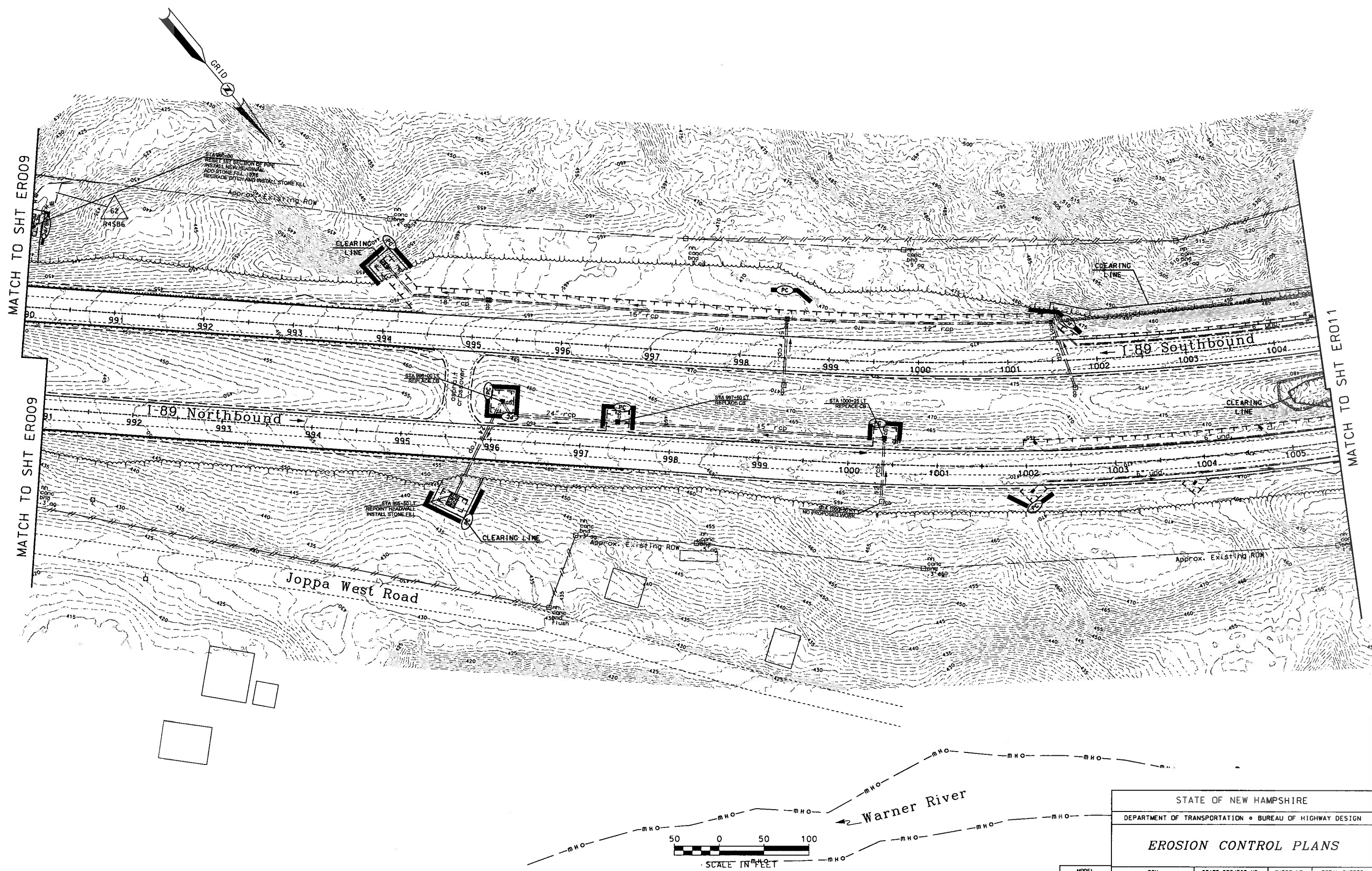
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AS BUILT DETAILS			DATE			



SOR PROCESSED				REVISIONS AFTER PROPOSAL			
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REVISIONS AFTER PROPOSAL		STATION	DATE	DESCRIPTION



STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
EROSION CONTROL PLANS				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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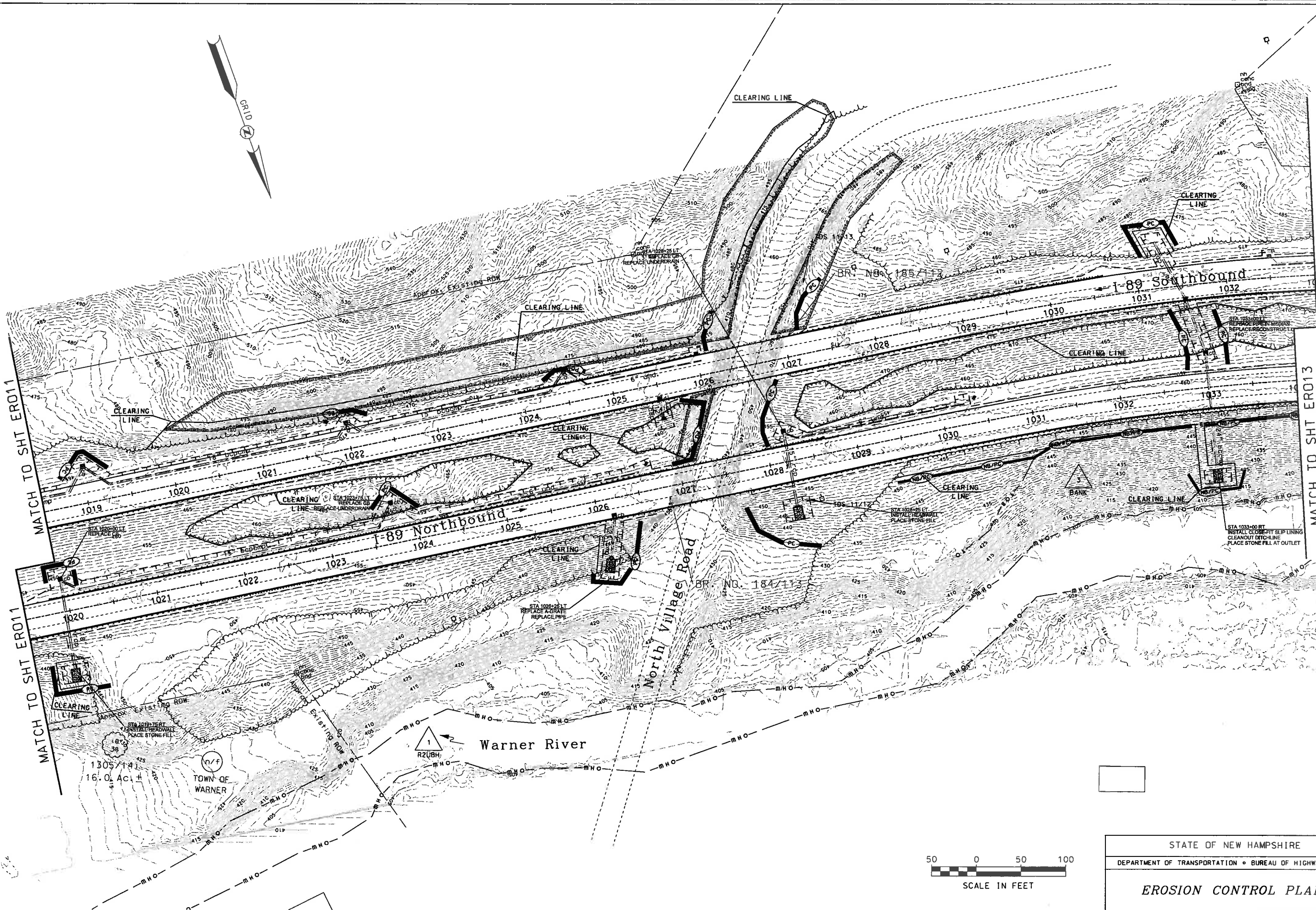
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STATE OF NEW HAMPSHIRE
 DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

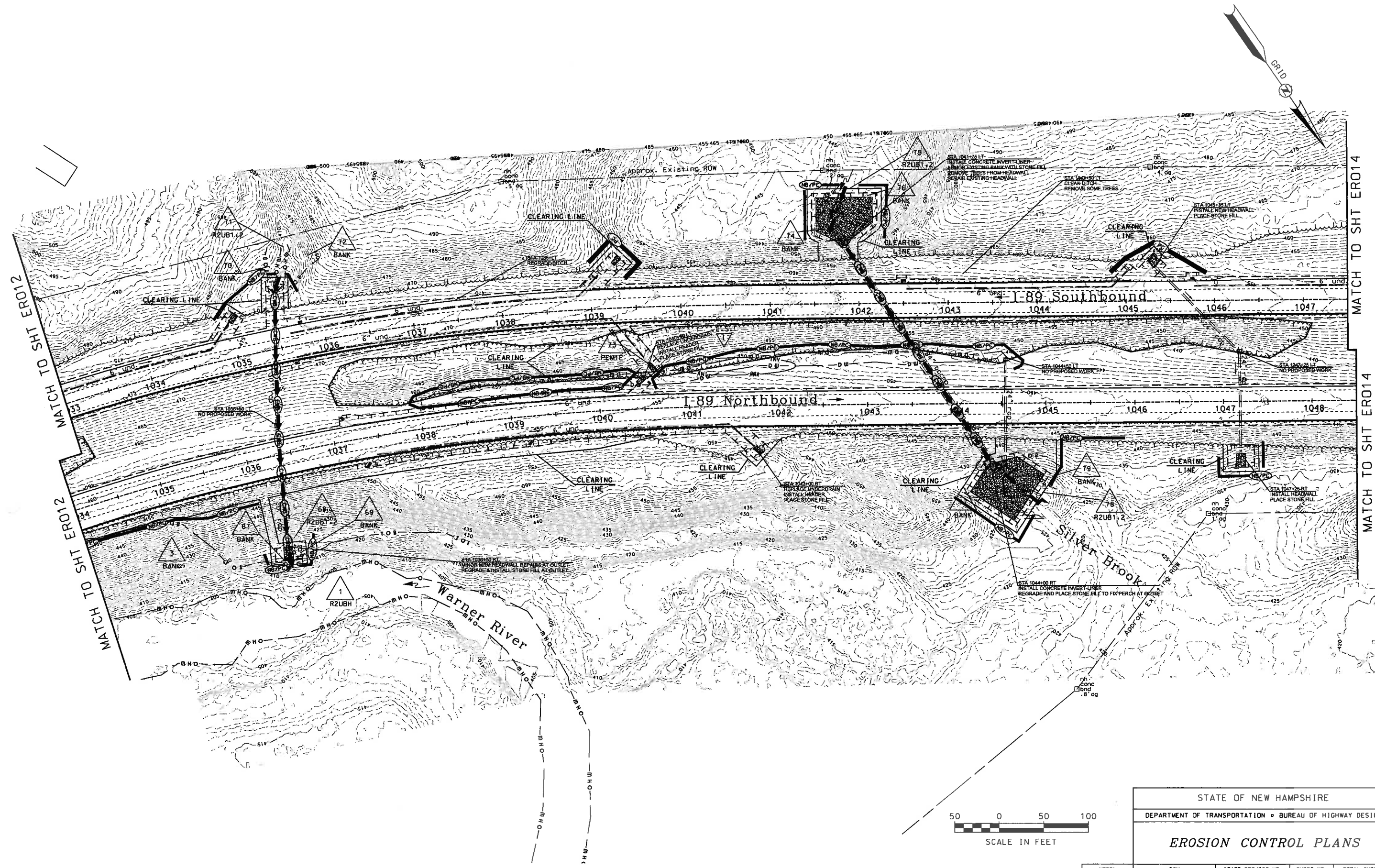
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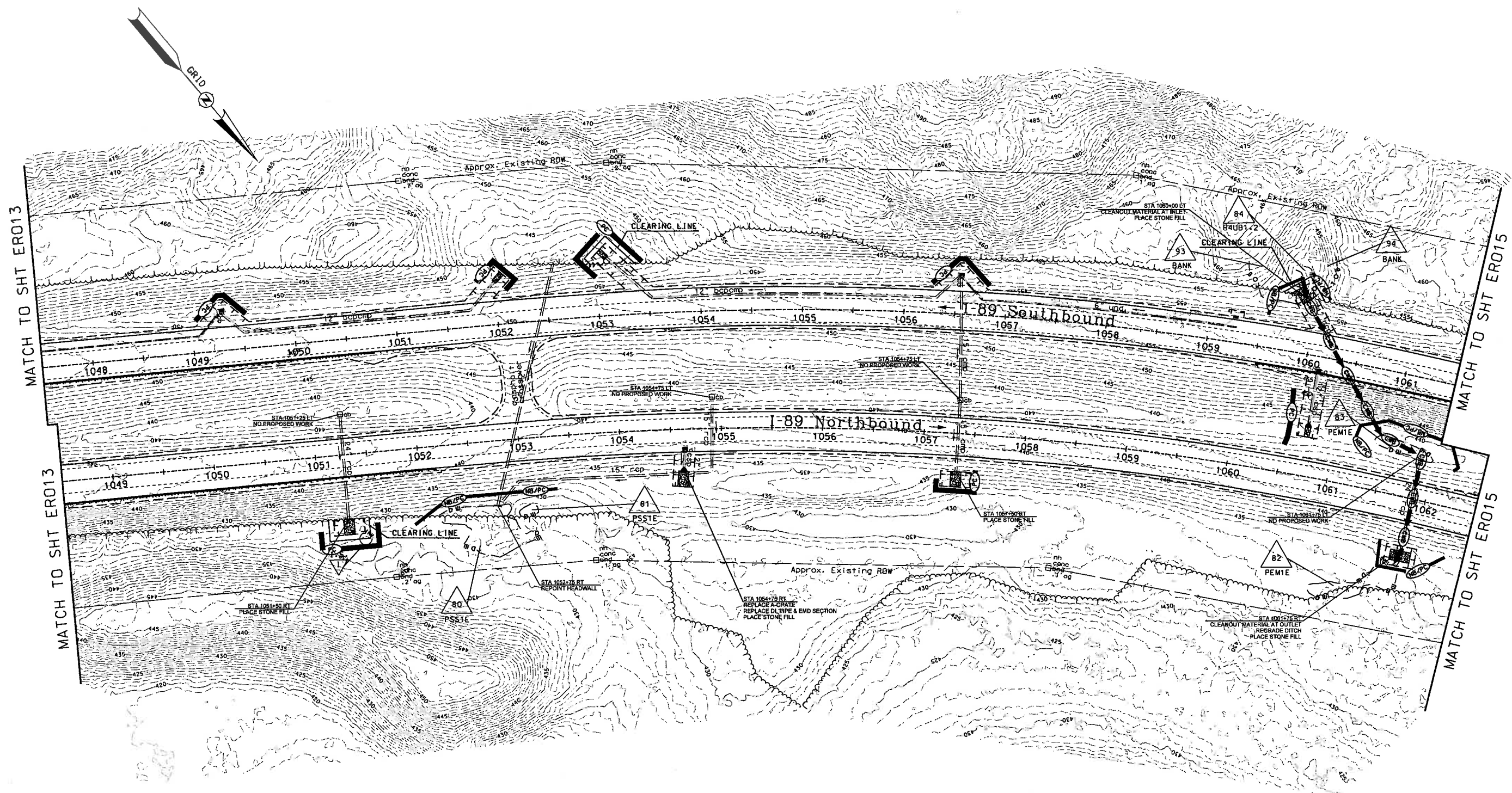
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MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
ER012	40512eroplans	40512	36	43

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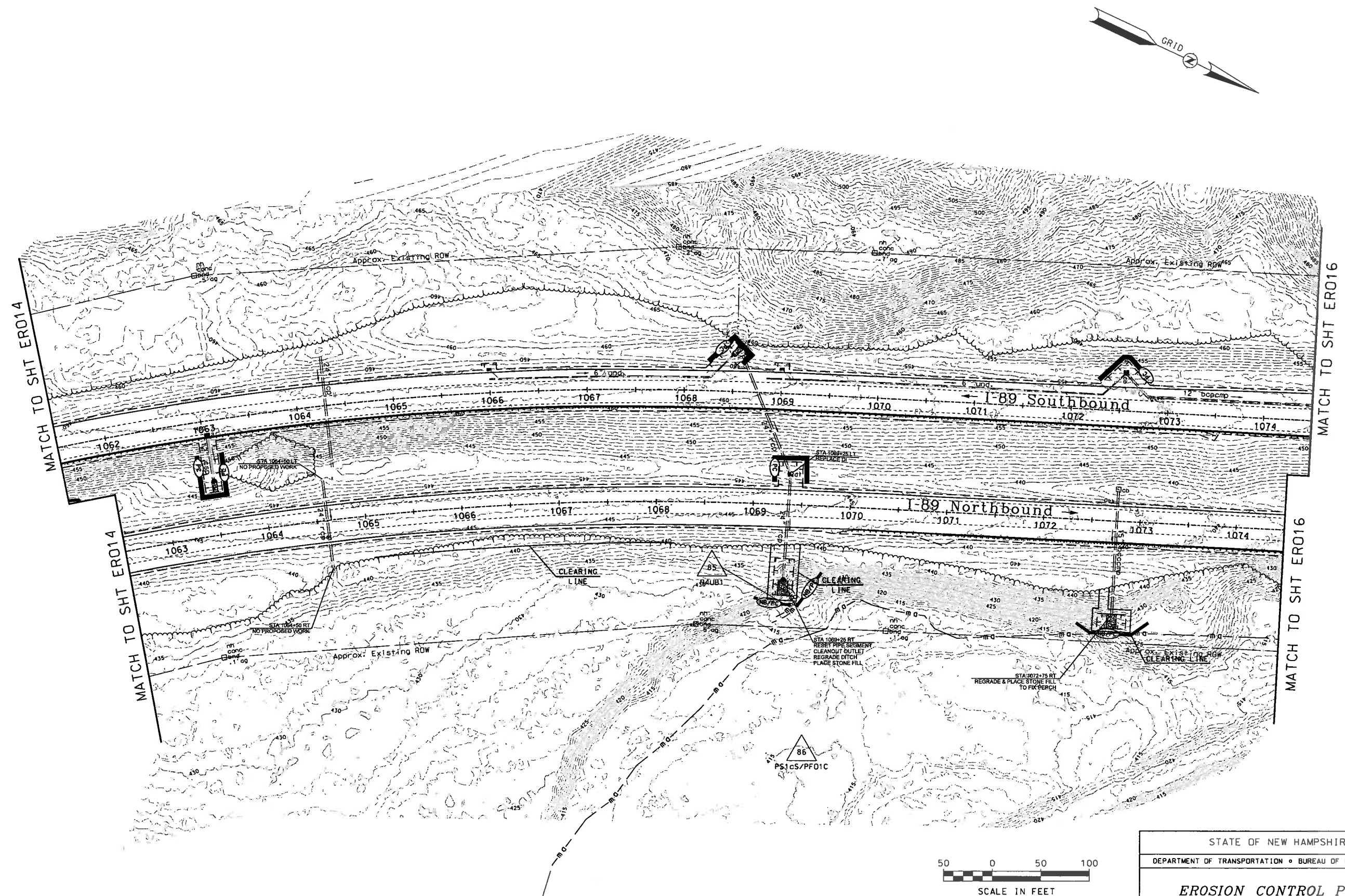


STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
EROSION CONTROL PLANS				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
ERO13	40512eroplans	40512	37	43

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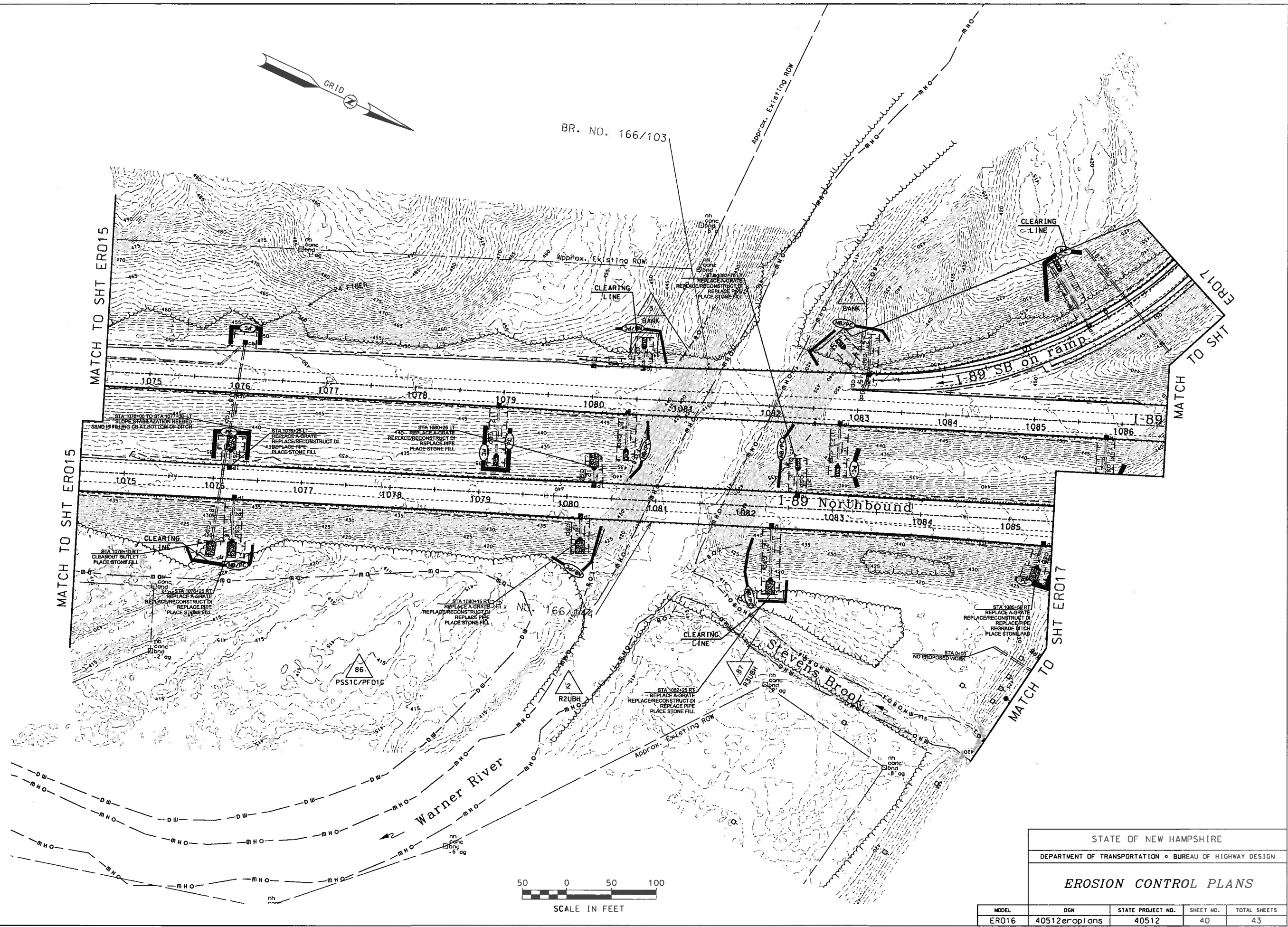


STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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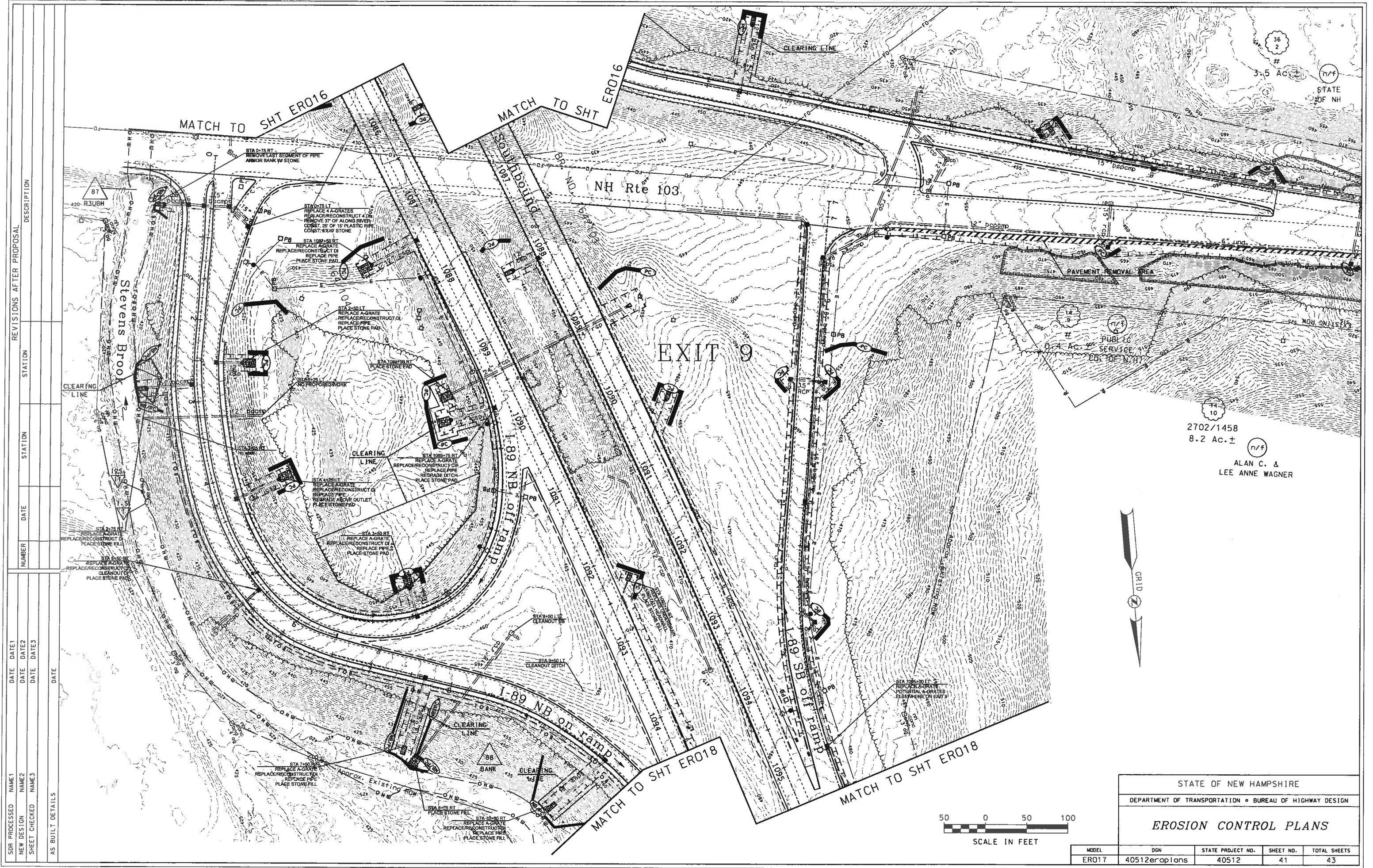
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STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
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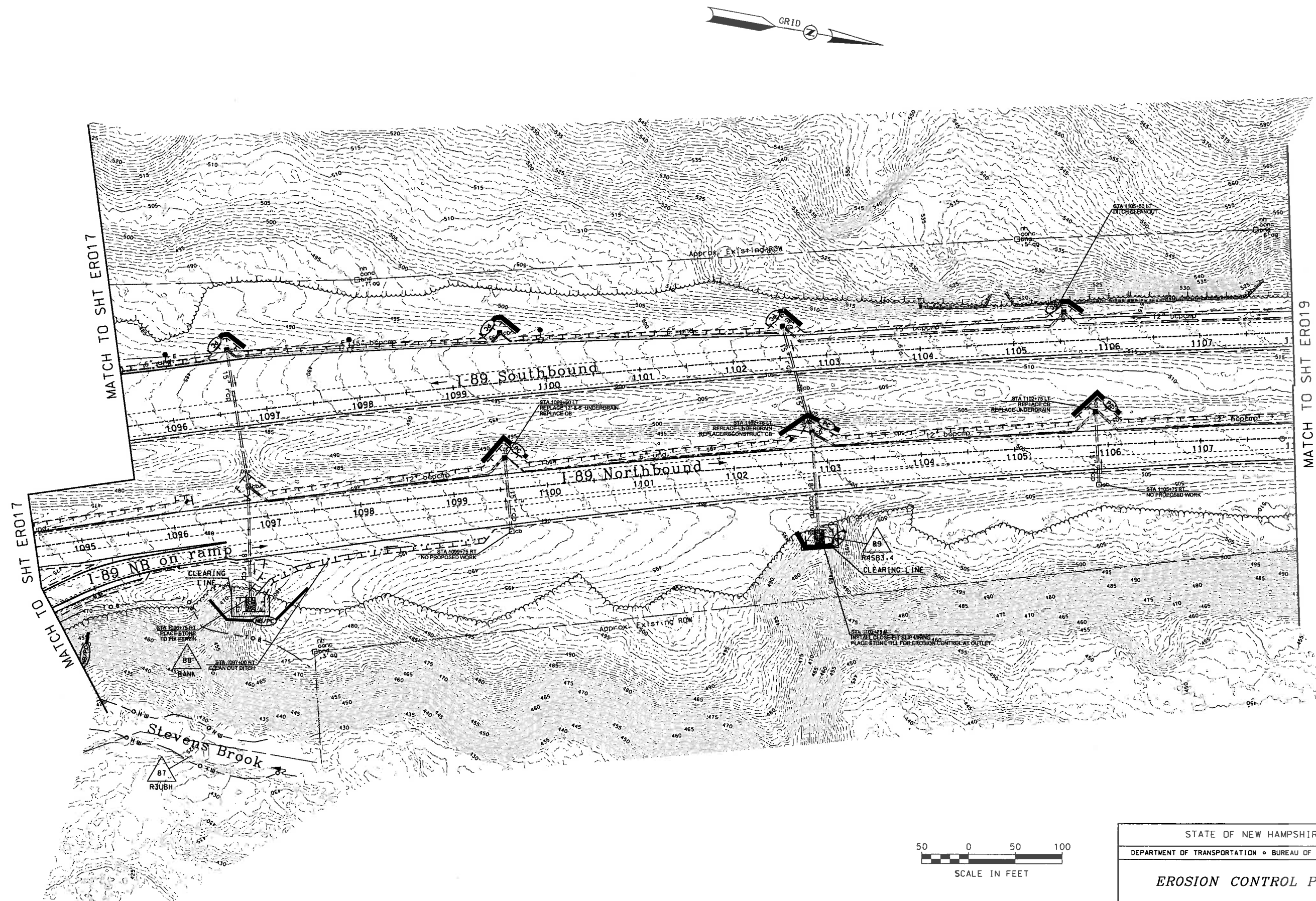
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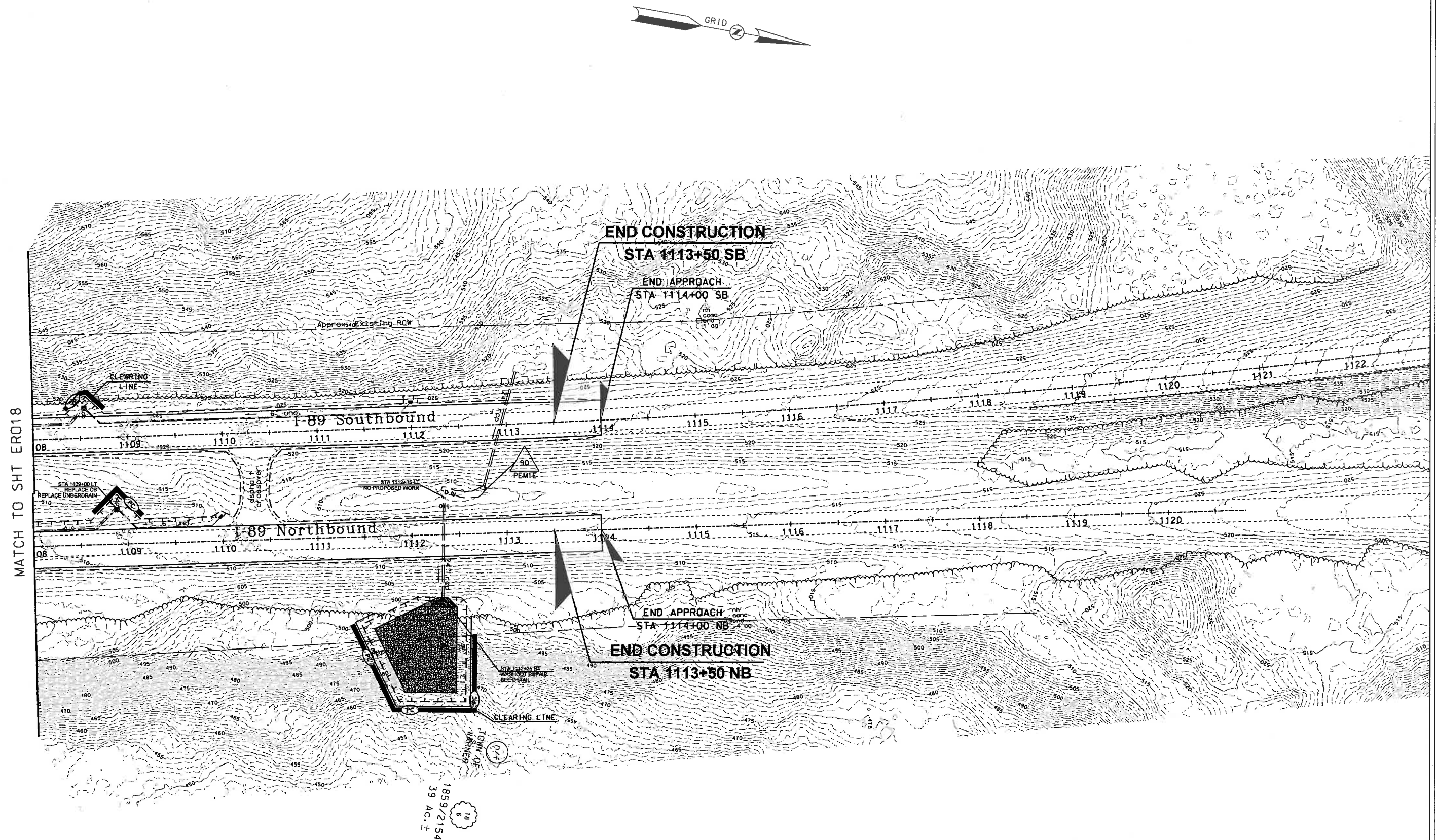
STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
EROSION CONTROL PLANS				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
ER016	40512eroplans	40512	40	43



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STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
<i>EROSION CONTROL PLANS</i>				
MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>EROSION CONTROL PLANS</i>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
40512eroplans	40512	43	43